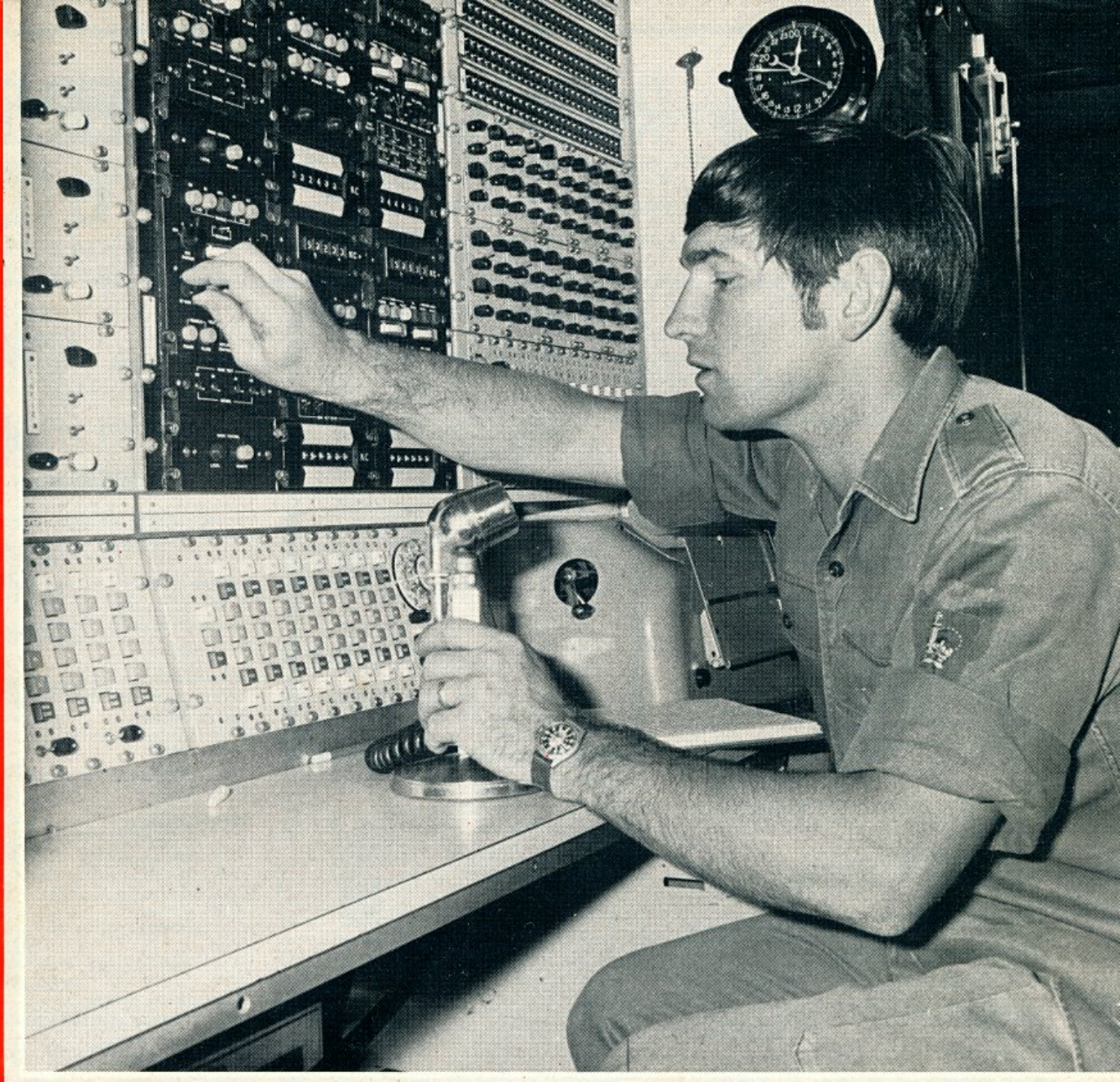
amateur radio



VOL. 44, No. 8 AUGUST 1976

CONTENTS

COVER PHOTO

Warrant Officer Bernie Simmonds operating the Collins mobile communications centre on 21 MHz. This equipment is fully automated, self-tuning on all frequencies and was displayed at the Royal Australian Corps of Signals Golden Jubilee celebrations last November.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

HAM RADIO SUPPLIERS

323 ELIZABETH STREET, MELBOURNE, VIC., 3000

Phones: 67-7329, 67-4286

Our Disposals Store at 104 HIGHETT ST., RICHMOND (Phone 42-8136) is open Mondays to Fridays, 9.00 a.m. to 5.00 p.m., and on Saturdays to midday.

NEW LINER
27 MHz Transceiver

Suitable for Novice Amateurs

5 W, AM 23 Channel 12V DC operation.
S-meter, squelch, ant. & PA facility.

$115 P&P $3

AMATEUR TRANSCEIVERS

YAESU FT101E 160-10m SSB, AM and CW Transceiver with RF speech processor fitted 240V AC and 12V DC PSU inbuilt. **$670**

KENWOOD TR7200G 2 metre FM Transceiver, 10 watt and 1 watt operation fitted with crystals for operation on 146.1 and 146.4 repeater channels 12V DC. **$215**

KENWOOD TR2200G handy 1 watt, 12 channel transceiver for 2 metres FM. Fitted with 4 sets repeater crystals. Inbuilt ni-cad charger. **$180**

ICOM IC202 2 metre SSB Transceiver, 3W PEP, SSB operation. Provision for external antena, DC input etc. **$195**

MULTI 7 2 metre FM Transceiver fitted with 7 repeater, 7 anti-repeater and 3 simplex channels, 10 watt and 1 watt output. 12V DC operation. **$230**

KEN KP202 stubby helical antennas. **$6.50**

27 MHz (11 METRE) EQUIPMENT

LAFAYETTE HA310 Walkie Talkies, 1 watt 3 channel fitted with 27.240 crystals. PMG approved. **$135 pair**

LAFAYETTE MICRO 66 5 watt transceiver, 6 channel operation, fitted with one set crystals. **$139**

LAFAYETTE 27 MHz fibreglass cowl mount mobile loaded antenna, 36" long, complete with base and coax. **$23.95**

LAFAYETTE 27 MHz combination AM Radio and 27 MHz loaded antenna complete with splitter harness, cables and plugs. **$28.95**

LAFAYETTE 27 MHz gutter mount mobile antenna complete with coax cable and PL259 plug. **$22.50**

¼ WAVE STAINLESS STEEL 27 MHz mobile antenna with heavy duty spring, base and insulator. **$30**

6 CHANNEL 5 watt AM 27 MHz mobile transceiver. PMG approved for 27-880 MHz operation with crystals for 27.880. **$101.50**

LAFAYETTE "Range Boost" ½ wave vertical antenna for 27 MHz base station use. **$59**

LAFAYETTE ¼ wave ground plane antenna. **$35**

52 OHM COAX CABLE, ¼" diameter. **55c metre**

PL259 COAXIAL CABLE PLUGS. $1.60 each

REDUCER to suit for ¼" coax. **40c each**

SO239 COAX CHASSIS SOCKETS. $1.40 each

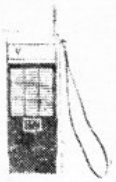
AUCTION SALE

Due to the proposed re-building of Bridge Road, Richmond during the next twelve months we have decided to temporarily move our operations at 390 Bridge Road, to our Bulk Store at 104 Highett Street, Richmond. As previously advertised we are desperately short of space and with the re-location of our business, the need has become even more urgent! An Auction Sale of new and used equipment comprising: components, test equipment, transmitters, receivers, transformers, cable, relays and hundreds of other items is proposed for the near future and will be held at 390 Bridge Road, Richmond.

You are again invited to call at our Bulk Store and inspect the large range of equipment which must be cleared. No reasonable offers will be refused!

Catalogues are now being prepared for the Auction and should be available soon from any of our three present locations.

MODEL NC-310 DE LUXE 1 WATT 3 CHANNEL TRANSCEIVER



- **WITH CALL SYSTEM**
- **EXTERNAL AERIAL CONNECTION**

SPECIFICATIONS:

Transistors: 13
Channel Numbers: 3, 27.24 OMHz
Transmitter Frequency Tolerance: ±0.005%
RF Input Power: 1 watt
Tone Call Frequency: 2000 Hz
Receiver type: Superheterodyne
Receiver Sensitivity: 0.7 uV at 10 dB S/N
Selectivity: 45 dB at ± 10 kHz
IF Frequency: 455 kHz
Audio Output: 500 mM to Ext. Speaker Jack
Power Supply: 8 UM-3 (penlite battery)
Current Drain: Transmitter 120-122 mA
Receiver: 20-130 mA.

$49.50 each or $95 a pair

Post & Pack $1.50 per unit

11 METRE (27 MHz) CRYSTALS

We have Walkie-Talkie Crystals for the following frequencies:

27.065	27.155	27.880
27.085	27.165	27.235
27.125	27.225	27.255
27.240	27.910	27.265

$6.50 A PAIR (Transmit and Receive)

2 METRE CRYSTAL SPECIAL

We have purchased a quantity of crystals to suit the KEN KP202 Transceiver and offer them at a special reduced price while they last.

Transmit Crystals	Receiver Crystals
146.10 MHz	146.70 MHz
146.20 MHz	146.80 MHz
146.30 MHz	146.90 MHz
146.40 MHz	147.00 MHz
	146.50 MHz
$3.50 EACH	146.55 MHz

BRIDGE ROAD, RICHMOND STORE SPECIALS

DIODES 1 amp. 1 kV Mini Diodes. Type A14P. 10 for **$1.50** — P&P 30c.

FLEXIBLE PLASTIC "CHOCOLATE BLOCK" 1.5 cm x 4 cm, 12 connectors, terminal strips. 10 for **$4** — P&P 75c.

POTENTIOMETERS 10 assorted new carbon pots. Popular values, ¼" shaft. 10 for **$4** — P&P $1.

TRANSFORMERS
TYPE 6426 44VCT at 1½ amp., 6.3V at ½ amp. **$4.50** — P&P $1.

TYPE PF3152 50VCT at 1 amp., 6.3V at ½ amp. **$4** — P&P $1.

METERS Edge Meter 0-1 mA calibrated 0-5
½" Face x 2½"W x 3"D **$3.00** — P&P 50c
Blank Face 0-1 mA 5⅞" x 4¼" **$5.00** — P&P 50c
Blank Face 50-0-50uA 3" square **$3.00** — P&P 50c
200uA Meter Calibrated 0-100
2½"W x 2¼"H **$3.00** — P&P 50c
Twin Level Meter 1⅞" x 1⅜"
250uA **$4.50** — P&P 50c
Signal Level Meter 1¾" x ⅞"
250uA **$3.50** — P&P 50c

MAGNETIC EARPIECE to suit most Transistor Radios, fitted with 2.5 mm plug. 10 for **$2** P&P 50c

6 ft. 3 CORE AC LEADS with moulded 3 pin plug. 10 for **$6.50** — P&P $1.50.

NEON FLASH TUBES (ex Repco). Ideal for ignition timing lights. **$1.50 each** — P&P 50c

ELECTROLYTIC CAPACITORS 50 assorted popular values. **$5** — P&P 50c

RESISTORS 100 assorted ½ watt carbon resistors, all popular values. **$2** — P&P 50c

WIRE WOUND RESISTORS 100 assorted, 5 and 10 watt. I.R.C. wire wound. **$8** — P&P $1.

POLYESTER TUBULAR CAPACITORS 100 assorted capacitors, all good popular values. **$4** — P&P 50c.

"PHILIPS" TYPE CONCENTRIC TRIMMER CAPACITORS 25 pF. 10 for **$2** — P&P 50c.

XENON FLASH TUBES suitable for Strobe use. (Sorry, no trigger transformers). **$1.50 ea.** P&P 50c.

TRANSISTOR SPECIALS

AY6102	Normally $1.99 ea.	10 for **$5.00** P&P 30c
2N3564	Normally 38c ea.	10 for **$2.50** P&P 30c
BC107B	Normally 32c ea.	10 for **$2.00** P&P 30c

EGG INSULATORS Quality porcelain Egg Insulators **35c** ea. or 10 for **$3.00** — P&P $1.

BATTERY HARNESS to suit 9 volt 216 batteries. 10 for **$1** — P&P 50c.

MAIL ORDERS WELCOMED. Please allow pack and post on items listed on this page. If further information required send a stamped SAE for immediate reply from the above address. Larger items can be sent F.O.B. Due to circumstances beyond our control, prices quoted in this advertisement are subject to alteration without notice. New equipment available at our Bridge Road Store.

amateur radio

Published monthly as its official journal by the Wireless Institute of Australia, founded 1910.

AUGUST 1976

Vol. 44, No. 8

PRICE: 90 CENTS

(Sent free and post paid to all members)

Registered Office:
2/517 Toorak Road,
Toorak, Victoria, 3142.

Registered at the G.P.O. Melbourne for transmission by Post as a Periodical — Category "B".

Enquiries and material to:
The Editor,
Box 2611W, GPO Melb., 3001

Copy is required by the **third of each month.** Acknowledgment may not be made unless specially requested. All important items should be sent by certified mail.
The Editor reserves the right to edit all material, including Letters to the Editor and Hamads, and reserves the right to refuse acceptance of any material, without specifying any reason.

Advertising:
Advertising material should be sent direct to **P.O. Box 150, Toorak, Vic., 3142,** by the **25th of the second month preceding publication. Phone: (03) 24 8652.**
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QSP UNITY IS STRENGTH

It is a fact that the Trade Union Movement has got where it is through the principles of unity and numerical strength.

Amateur radio societies need to emulate these principles.

Why?

Because the testing time for amateur radio is going to be WARC 79 and the years following it.

All the officers of the IARU are convinced of this. All the officers of the ARRL are alert to the danger signs. All the officers of the RSGB, WIA and other societies find the evidence irrefutable.

Regrettably this is a deadly serious matter. It is not rumour or conjecture.

What can "Mr. Average Amateur" do about it?

Firstly he can help build up the numerical strength of his amateur society — the WIA — by going out of his way to recruit new members and help to keep them.

Secondly he should do everything he can to encourage his fellow amateurs to comply with the spirit of amateur radio.

Thirdly he can do his bit by using the amateur bands — as many bands as he can, as often as he can. And moreover explore and use the higher UHF/SHF/Microwave frequencies.

As might be expected, higher membership brings other benefits such as more people to share the costs, more ideas coming into the system and hopefully more members to help where help is needed. I commend most strongly your full support for our recruiting drive and help in the other areas listed above. Suitable recruiting brochures are now available, backed up by an advertising campaign.

D. A. WARDLAW VK3ADW, Federal President.

QSP

FAX

From Radio Communication, March '76 it is learnt that UK Amateurs are now permitted to conduct fascimile transmissions on 3.5-3.8, 7-7.1, 14-14.35, 21-21.45, 28-29.7 and 144-146 MHz. Upon reprinting the licence forms emissions A4 and F4 with a bandwidth not greater than 6 kHz will be included. This does away with individual special applications.

AUSTRALIAN STANDARD 3159-1976

This was first published as ASC 159 in 1959, revised as AS 3159 of 1972, and is now issued as a revised AS 3159-1976. It refers to equipment produced and used for household, office or entertainment purposes and similar general use operating at supply voltages not exceeding 250 V single phase. The standard covers a very wide range of items (including single units or modules as well as equipment designed for connection to extra-low voltage or batteries having circuits which operate above extra-low voltage) and includes tape recorders, record players, radios, TVs, power supplies, etc., but is not intended to restrict the use or performance of transmission equipment. The specification is to be read in conjunction with Part 1 of the SAA Wiring Rules and AS C100 and also refers to AS C145 Radio Interference Suppression Devices, AS 1044 Limits of Electromagnetic Interference for Electrical Appliances and Equipment, and AS 1053 Radio Intereference Limits and Measurements for Television and Radio Receivers. AS 3159 is entitled "Approval and Test Specification for Electronic Sound and Vision Equipment".

RADIO COMMUNICATION EXHIBITION — LONDON

A circular from the RSGB advises that their Radio Communication Exhibition will be held this year from 30th July to 1st August at Alexandra Palace. This is in the Muswell Hill area of Nth. London. An international night for overseas visitors is to be held on Friday evening 30th July. Anyone in the UK at that time should not miss this exhibition of amateur and other gear.

JOTA 1976

Do make a note that time moves on. The 19th Jamboree on the Air will be 16th and 17th October 1976. Suggested starting time is 00.01 h local time on Saturday the 16th and ends at 23.59 h local time on Sunday. This is Scout Communications Year. Thus the Scouts will need greater help than ever. World Scout frequencies are useful for calling CQ Jamboree when free. They are 7090, 14290, 21360 and 28990 kHz for phone, 3590, 7030, 14070, 21140 and 28190 kHz for CW. If you want more JOTA details why not join in the Australian Scout Radio net, first Sunday of each month from 9.30 to 11.00 h EAST around 7070 kHz or near 14290 kHz from 11.00 to 13.00 h EAST same day.

ITU

"The latest member of the International Telecommunication Union is the Republic of Guinea-Bissau. The ITU now has 148 members. In accordance with United Nations principles the latest ITU member will have one vote at conferences, as do all nations who take part". Radio Communication May '76.

PREFIXES

According to Radio Communication May '76 the ITU has provisionally allocated the callsign series D6A-D6Z to the State of the Comoros.

QSP

Here is a listing of some less well-known HF standard time and frequency transmissions. They may be a useful band opening indicator.

Station CHU in Ottawa runs 5 kW on a continuous basis on 3.33, 7.335, 14.670 MHz.

The following USA Armed Services stations may also be useful.

All frequencies are in MHz.

NPG, 12.966; LOL, 17.183; NPM, 13.649; FTK77, 10.775; DAM, 16.980; and NSS, 5.4485, 8.090, 12.135, 16.180, 20.225, 25.590.

THOUGHT FOR WARC 79

"At present, VHF repeaters are spaced 25 kHz apart as are the "S" (simplex) channels, with 50 kHz spacing on UHF. It seems to us that we are laying ourselves wide open to the idea that amateurs on the VHF/UHF's will not be assigned bands in the future, but a few spot frequencies. Are we not inviting this by this obsession with 'channels?' What is there to stop a non-amateur faction proposing that the two metre band be halved and the amateurs allocated a few channels at 12.5 kHz spacing. In the UK, there is a concentration of SSB activity in the 144.15-144.35 MHz region, followed by a relatively little used band from 144.35-145.0 MHz. To make a case for the retention of the present 2 m band, we must make more use of this wasted space". Edit. In Mobile News May '76. And, by the way, in the UK they only have 144-146 MHz as their 2 m band.

OLYMPIC GAMES

QST for June '76 has the news that special agreements will permit the handling of third party messages during the Olympic Games in Montreal from 3rd July to 15th August. The special agreements negotiated to that date were between Canada and 32 other countries of which Hong Kong, Korea and the Philippines were the only ones in Region 3. Incidentally, on this subject the same issue carries an article about the dangers at ITU conferences of third party traffic, and quoted this as the explanation why one African delegate voted against amateur radio at the 1971 Space Conference.

WIANEWS

Central Office was bombarded with letters during June on a number of 1976 Convention Motions requesting various amendments to the Handbook.

Several more are still in the pipe-line for further work to be done on them.

June was a quiet month on WARC 79 as the agenda for the Conference is expected at any time.

A new development on the Australian CB scene put in an appearance during June when a group in Sydney organised a meeting on the 10th to launch the promotion of a CB service by legitimate methods. The alleged pirates concerned publicly stated they had ceased their transmitting activities in order to achieve their goal.

The Institute cannot condone pirate operations because the amateur service is a legal service and must operate within the law. The attempt to obtain legality of CB operations is too new to draw any conclusions except that the changed situation will surely be of considerable interest in many ways. It has not passed unnoticed.

There was an interesting editorial in April QST about their own legal CB service in the USA which merits study by those who might seek to update themselves on the subject.

Mr. Roget, VK3YQ, a member of the Executive, attended the NZART Golden Jubilee celebrations in Auckland early June. A letter from him referred to the address given by Dr. William Pickering head of the Jet Propulsion Laboratory in California and himself a Kiwi and an amateur of long standing. VK3YQ commented "one message clearly spelt out is that digital communications is a must for the future".

Another speaker at the Auckland conference was the New Zealand P.M.G. who announced that Novice Licensing would take effect there from March next year — one year tenure, 6 wpm morse and lower grade technical requirements.

At the June Executive Meeting the Federal President, Dr. Wardlaw VK3ADW, announced his intention to attend the CQ Convention in Rockhampton on 28th/29th August and hoped to visit both Townsville and Brisbane whilst in Queensland if local amateurs in those centres might like discussions.

At their June meeting the VHF/UHF Advisory Committee finalised recommendations for beacon segments and these are now in the hands of Divisional Councils for comments. Another item was the preparation of submissions to the P and T. Dept. relating to the Broadcasting Inquiry.

The Executive also received a proposal from the Federal WICEN Co-ordinator, VK1QJ that the primary channels for WICEN nets should be 3600, 7050 and 14100 kHz plus secondary channels. This is also in the hands of Divisions for comments. VK1QJ attended a seminar at Mt. Macedon and commented afterwards that all services should have no doubts about what WICEN is and can do.

Publicity for the WIA was another matter finalised along with a recruiting drive. Members should therefore expect to see advertisements in all the main Australian Electronics magazine during August and new recruiting folders should become available at the same time.

A videotape was made of the immensely interesting lecture on aerials by G6CJ, "Dud" Charman, given to members of the VK3 Division late in June. When this has been edited and copied it is hoped it will form the nucleus of a Federal videotape library for controlled use at group meetings. ■

QSP

EXAM SYLLABI — USA

"The FCC in its continuing efforts to maintain a meaningful and equitable examination program for the Amateur Radio Service, is releasing new study guides. They are in the form of a syllabus which outlines the various categories of questions from which the examinations are devised, and include sample questions representative of those appearing in the actual examinations. In the past the FCC study guides have contained questions which, until recent years, were generally not arranged in any reasonable or logical fashion and usually quite similar to, or even identical to, those found in the examinations. The new study guides will reduce the possibility that an individual may acquire an amateur radio license simply by memorising the answers to these specific questions without being otherwise qualified. Additionally, the new guides have been designed to permit much greater flexibility in the selection of examination questions. Such flexibility allows more frequent revision of amateur examinations and therefore results in a more equitable examination program". Worldradio News April '76.

MORSE CODE TEST — USA

"Instead of the present morse code testing method, the FCC will administer on a limited, trial basis a multiple choice examination covering a five minute transmission of plain text. Such a test would relieve the applicant of the tedious burden of copying one minute of mixed text without error, yet would provide an accurate gauge of his competency in the reception of morse code message content, the FCC said." Worldradio News April '76.

DSBSC

The editor of Mobile News reports in the May '76 issue receiving a letter from their licensing authority that special authority had been given from time to time to use the double sideband suppressed carrier mode by radio amateurs but a decision has now been made that this will be discontinued. It is stated that this is a mode of transmission not permitted by international radio regulations and it is difficult to monitor without special equipment.

QSL ADDRESSES

In the list on page 5 of AR June 1976 there was a misprint of the street name for VK3 outwards bureau Mr. W. L. Jackson. The name should be Malane Street and not Maine Street as printed.

RFI LEGISLATION — USA

"Most consumers do not understand that when they may encounter interference with their home television or radio set after an amateur or citizen band radio operator moves next door, the source is not a defect in the equipment of their neighbour, but with their own radio or television receiver. This interference can be corrected in almost all cases by the installation of simple filtering or shielding parts and could be accomplished most efficiently and economically if it were done by the manufacturer". Introductory remarks by Senator Barry Goldwater, K7UGA, to his RFI legislation for the US Senate as reported by Worldradio News March '76.

RFI COMPLAINTS — USA

The FCC now finds that 80% of the RFI complaints involve transmitters operating on frequencies assigned to the Citizens Radio Service, and complaints involving amateur stations have increased from 4% in 1975 to 7% in 1976 according to a spokesman of the FCC Enforcement Division as quoted in Worldradio News April '76. Most of the amateur station RFI complaints are attributable to audio rectification and front-end overload in television receivers, and hence, are due to design deficiencies in the home entertainment equipment. Roughly 60% of the 24,418 electronic home entertainment device complaints involved TV receivers. An increasing number of individuals are now noted to be taking their complaints directly to their representatives in Congress rather than to the FCC. Another item reported was the problem of power interrupters (which senses and current from one or two mA between the hot side of the AC mains and ground which immediately and automatically opens the circuit) being triggered by transmitters.

SPEED TRAPS — USA

"A resolution adopted by members of the Albany Amateur Radio Association at a recent meeting declares that 'It is not in the spirit of Amateur Radio or in the 'public interest' to use Amateur Radio to report the location of police highway radar installations'. The resolution pledges members to refrain from transmitting such warnings over their Amateur Radio equipment. It points out that it is the purpose of all radio amateurs to cooperate in upholding our tradition to support the laws under which we operate". Worldradio News April '76.

MORSE CODE SPEEDS

"The proof of eligibility (Radio Club of America 5 star citation) for membership rests with the ability to answer the 80 wpm questions properly and with accurate comprehension. Faked up responses are easily detected. Bill (Eitel) said that what sets this method apart from the teletype method is the extension of the customary method of CW break-in conversations. Most of the contacts are around 7035 kHz or 14035 kHz, and added that CW at super speeds will get there when single sideband won't. W2KFA who attended the meeting of the club is capable of reading 100 wpm". Worldradio News April '76.

EMERGENCIES

"The Guatemala earthquake was a tragedy of enormous proportions to the people in Guatemala. What is less obvious, however, is that many people in the New York metropolitan area suffered deep anguish as well. Their concern, of course, was over the safety of friends and relatives in Guatemala. Normal telephone communications were severed completely. Government agencies were unable to help. All of the local police, fire, public works and citizns band radio systems were totally of no avail. Only amateur radio was in a position to help, and help it did". Worldradio News April '76. WICEN activities in VK need your help also.

HEIGHT RESTRICTIONS ON TOWERS — USA

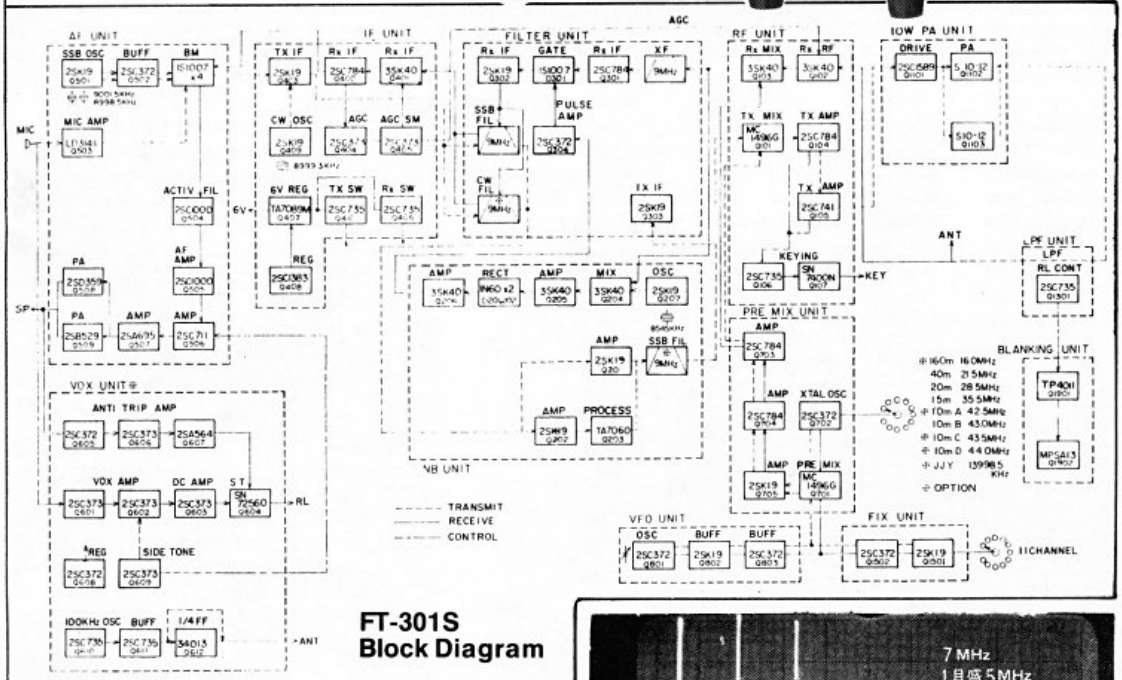
"The City of Maplewood, MN recently amended its zoning code to specifically exclude an Amateur Radio tower from the classification of a building or a structure. Therefore, Maplewood amateurs will not have to seek a variance every time they want to put up a tower over 30 feet". FCC regulations allow antennas up to 100 feet in height. Worldradio News April '76.

YAESU

Latest addition to the YAESU line —

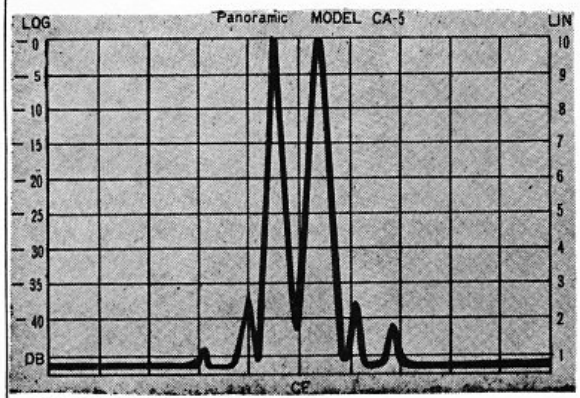
FT-301S ALL SOLID STATE HF TRANSCEIVER

The FT-301S is an advanced fully solid state H.F. SSB and CW transceiver covering 160 mx thru 10 mx, including one auxiliary band and WWV. It has all the outstanding features of Yaesu's top performance FT-101E (inc. built in RF Processor) plus many more additions (compact, solid state final, low power consumption).

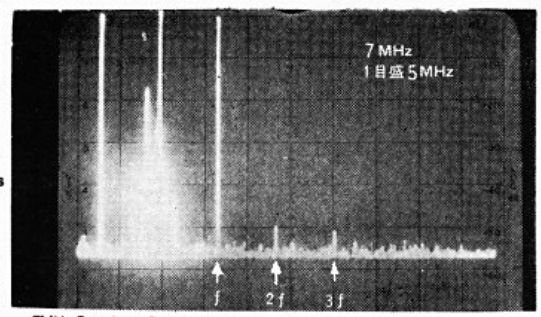


FT-301S Block Diagram

Eleven crystal locked channels and 10 Watts PEP make the FT-301S particularly suitable for the new Novice and, at a later date, a 100 Watt outboard linear amplifier will be available from Yaesu, enabling the FT-301S to be uprated for full licence operation. Additional plus features include automatic high VSWR protection of the final amplifier output transistors and selectable 100 KHz and 25 KHz calibration. Special care is taken to reduce unwanted harmonic radiation by the inclusion of separate double section Low Pass Filters for each band. Stocks of the FT-301S are expected toward the end of September.



Graph shows Intermodulation products



7MHz Spurious Radiation

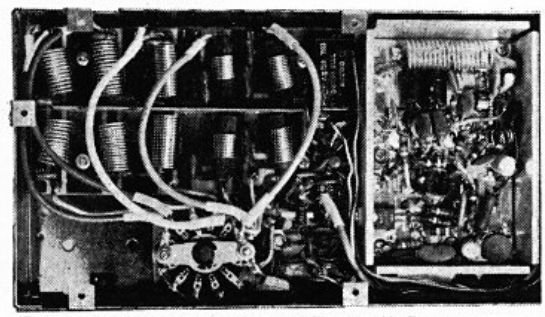


Photo shows double section Harmonic filter used in Final

Technical Data

Frequency Range
160m 1.8-2.0 MHz.*
80m 3.5-4.0 MHz.
40m 7.0-7.5 MHz.
20m 14.0-14.5 MHz.
15m 21.0-21.5 MHz.
10m A 28.0-28.5 MHz.*
B 28.5-29.0 MHz.
C 29.0-29.5 MHz.*
D 29.5-30.0 MHz.*
WWV 5.0-5.5 MHz.*
Aux. 27.0-27.5 MHz.
Mode
LSB, USB, (A3J)
CW (A1)
Input Power
A1, A3J, 20 Watts DC
Carrier Supp.
Better than 40dB
Adj. Sideband Supp.
Better than 40dB
Spurious Rad.
Better than —40dB
Audio Response
300-2700 Hz. ±6dB
Intermod. Distortion
Better than —31dB
Frequency Stability
300 Hz or better within the first 30 minutes and less than 100 Hz after warmup
Input Impedance
50 Ohm
Mic Impedance
500 Ohm
RX Sensitivity
0.5μV for 10dB S/N
Image Rejection
Better than 50dB
Selectivity
SSB —6dB at 2.4 KHz
—60dB at 4.0 KHz
CW —6dB at 0.6 KHz *
—60dB at 1.2 KHz
Crossmod
Better than 60dB with a 20dB signal at the ant. terminal 20 KHz away
Audio Output
3W at 10% THD.
Output Impedence
4 Ohms.
Supply Voltages
DC 13.5V Receive 0.4 Amp
Transmit 3 Amp (at 10W)
AC 234V Receive 40 VA
(With FP-301) Transmit 110 VA (at 10W)
Dimensions
280mm wide, 125mm high, 290mm deep
Weight
7 kg.

*Options

Anticipated Prices
FT-301S Transceiver **$549**
FV-301 Matching VFO **$120**
FP-301 Heavy Duty AC Power Supply **$130**
(May also be used to power 100W final)

bail ELECTRONIC SERVICES

60 Shannon St., Box Hill North, Vic. 3129. Phone 89 2213
Agents in all States and A.C.T.

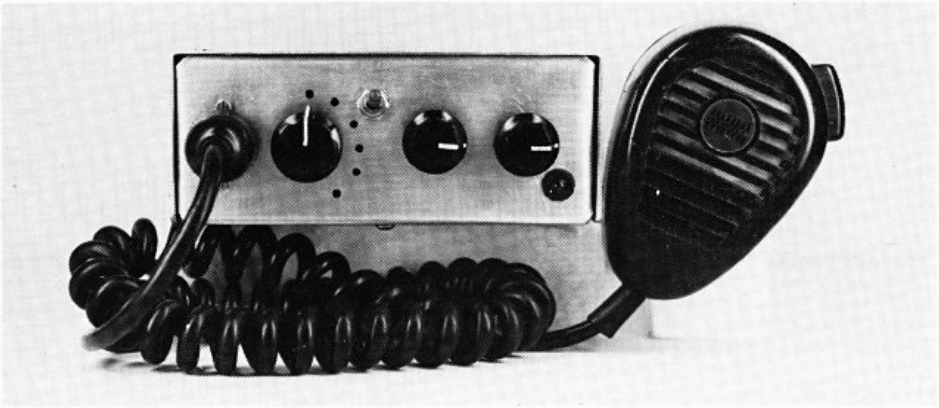
FRED BAIL VK3YS
JIM BAIL VK3ABA

JAS7677-2

THE SMALLER THE BETTER

Don Sinclair VK3VH
6 Tintern Drive, Springvale South

Many modern cars, although they have dash layouts looking like aircraft cockpits, do not leave much room for niceties such as amateur radio transceivers. The following article should enable you to keep sweet with the XYL as well as giving you an insight into miniature techniques.



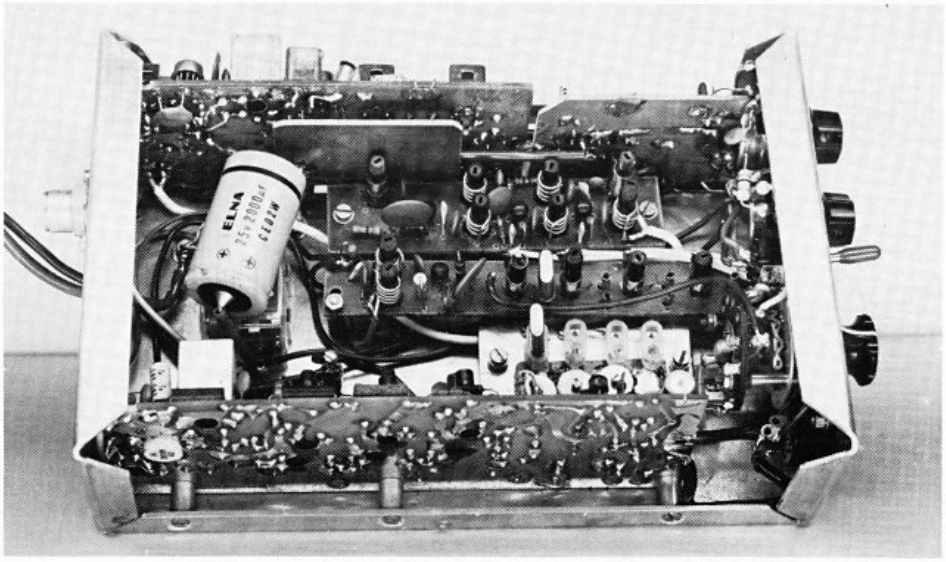
Not much larger than your fist.

The unit described is a 2 watt 2 m transceiver, basically an "AR" carphone, and is not designed to be a true portable, but to occupy as little space as possible consistent with sensitivity and power output.

The whole idea of the project was to condense already tried and true circuitry and layout, and come up with a smaller unit.

While the original PC boards were a truly professional presentation, they can be made smaller. This is accomplished, in my case, by using a spirit based pen, and with an original PC board, laid out in front of me, drawing an exact replica of the original straight on to the new board to be dipped. Mind you, it may not come out as you want it first go, but that is the fun of it.

When the RX and TX boards are to your satisfaction (and you have not missed any components), lay out the boards as they would appear in your intended layout. Naturally, all circuitry must be near the associated switching. You would not have the TX crystals on the other side of the case to the switch, would you?



Inside Don's transceiver, showing the extensive use of vertical printed circuit boards to conserve space. Photos: Ken Reynolds

Most of the boards in my rig have been mounted on their sides giving the rig a very low profile. "K" style crystals have been used throughout, and the TX uses the exact crystal switching and modulation process which I inserted in AR of September, 1975.

The case is the showpiece of any piece of equipment, so it should be made strong and as neat as possible. Approximately 4 hours previous to writing this article the last screw went into the rig and it was air tested. The sensitivity is quite good and an air-test with Bruce VK3UV, using his "Ken" (both ways 2 watts) was very pleasing.

Although not at present a true hand-held, a battery pack and rod antenna is to be installed and used for hand-held operation.

Also, the rig will have a switched channel to come out on 145.000 neat, which was triple via a varactor to 435.00 MHz, the 70 cm FM net. A converter will be incorporated to come back to 145 for receive. As the output on 435 will be in the vicinity of ½ a watt, a solid state RF amplifier will probably be incorporated to boost the power to a useable level. ■

THE G6CJ AERIAL CIRCUS

At least 200 Melbourne amateurs were present at the Debney Park Community Centre on the night of 23 June, in response to what had been described as "the chance of a lifetime" to hear and see one of the most notable lectures to be presented to VK3s for many a year.

The Divisional President, Phil Fitzherbert VK3FF, introduced to the audience Mr F. J. H. "Dud" Charman B.E.M. (G6CJ), a CW operator of long standing, who is not only a professional engineer with EMI but has spent many years developing and presenting to amateurs in many countries his unique demonstration of aerials in action. This was the 136th time that Dud has displayed his "aerial circus" to an amateur audience, and the equipment has evolved over the period into the present "Mark 3 solid-state" collection.

Dud began by explaining that the whole concept of the performance was to show by the use of models operating in the 3.3 GHz band all the radiation pattern characteristics of many types of aerials. At a wavelength of 10 cm the models themselves could be simply and quickly made from 18 gauge tinned copper wire and bits of plastic, so that even quite complex arrays and their feeders formed a self-supporting assembly. Balanced feed was

used to all driven elements, with the two-wire transmission lines having a Zo of about 200 ohms. The RF output of the generator was modulated by an audio tone (the traditional 400 Hz) and the radiated power distribution investigated with a hand-held probe detector which fed into an audio amplifier. Thus the audience could hear for themselves how the field strength varied with the relative position of probe and aerial.

Beginning (no surprise here!) with the half-wave dipole, we were quickly shown the significance of polarisation, and the traditional doughnut shape of the pattern was verified. It was shown that the "free-space" radiation decreased smoothly as the probe was moved away, but if a reflecting plane was set up a little distance from the dipole the field between them then exhibited standing waves. This led on to an assembly of two driven dipoles at half-way spacing and 180 degrees phase difference, producing maximum radiation in their plane and a null at right-angles to it. Since introducing a plane reflector at the null produced no change in the pattern, the assembly was revealed most elegantly to be equivalent to a single dipole above earth plus its virtual reflection-produced companion below the earth plane. From here on a metal-topped table was used to represent the ground above which all practical aerials must operate, and the effect of height on the number and elevation of the pattern lobes was clearly demonstrated.

More complex aerials were then investigated, such as long dipoles, long wires, vees and rhombics. Multiple driven-elements then led to the parasitically-excited Yagi arrays, again with emphasis on the relationship between pattern and height. Dud then transferred his attention to slot radiators, showing the current/voltage and polarisation duality between the slot and the dipole. He showed that the slot plane could be allowed almost to disappear (like the smile of the Cheshire cat!) leaving us with the well-known skeleton-slot, and then evolving into the quad. At this stage he passed on to multiple-dipole and slot arrays as used in radar, and

"Dud" Charman demonstrating his work under the watchful eye of the television camera. Photo: Ivo Splichal

showed how minor lobes could be controlled by proper proportioning of the element currents.

After briefly touching on some aspects of guided waves, the climax of the display was reached with the introduction of circular polarisation and helical aerials. The necessity for receiving and transmitting helices to be of the same sense was shown convincingly; but then, when opposite-sense aerials worked perfectly via a reflecting plane which obviously reversed the polarisation, the house broke into prolonged applause and Dud concluded his performance in a blaze of glory!

In the question time which followed, Dud displayed again his encyclopaedic knowledge of his subject, and it seemed that all those who asked questions were more than satisfied with the answers they received. After a vote of thanks moved by the Publicity Officer, John Adcock VK3ACA, the audience responded with acclamation. During the subsequent lengthy period of coffee, biscuits, and rag-chewing, all of Dud's "stock-in-trade" of sundry hardware and tiny aerials was inspected with great interest, and Dud himself was occupied with informal enquiries and discussion for the best part of an hour.

Thanks to the prior organisation of Peter Wolfenden VK3ZPA and his enthusiastic group of ATV operators, the whole of the formal part of the evening was recorded on video-tape, and it is hoped that this can be played to various meetings, conventions etc for the benefit of all those who were unable to be present at the "circus" themselves. Many of those who *were* there will also look forward to an opportunity to see it all over again. Like all good lecturers G6CJ possesses the ability to make it seem so easy at the time, but in retrospect there was so much information packed into the presentation, that this writer freely admits to some bewilderment at its scope. One could not afford to relax concentration even for a few seconds without missing some point or other.

If you have any interest at all in aerials, if you would like to understand them better without being confused by a mathematical smoke-screen, and you have a chance to see "The G6CJ Aerial Circus" either live or on the WIA video-tape, then DON'T MISS IT! VK3ABP ■

50 HERTZ NULL FILTER

Ron Cook VK3AFW

Perhaps you have a tape of the last VK6 opening on 432 but when you replay it, somehow the signal is almost killed by a 50 Hz hum picked up when recording. Do not despair, build this circuit and playback through it. It consists of a twin T notch, see figure 1, and will reduce the hum by 40 to 60 dB. Better still, play the tape through the filter and record onto another tape.

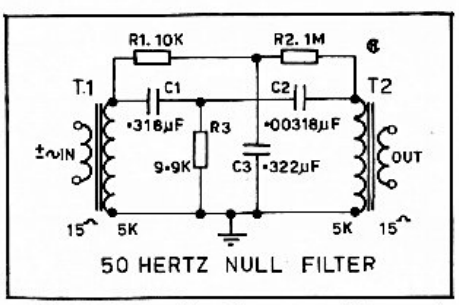


FIGURE 1

T_1, T_2, 5 K ohms to 15 ohms speaker transformers.

All resistors 1% tolerance. All capacitors trimmed to within 1% of value.

For other frequencies, say 100 Hz, we compute new values of C_1, C_2, C_3, as follows:

C_1 = = 0.159 uF @ 100 Hz.
C_2 = C1/100 = 0.00159 uF @ 100 Hz.

If other impedance transformers are available it is suggested that you use

$R_1 = 2Z$, $R_2 = 100\ R_1$, $R_3 = 0.99\ R_1$.

In its usual form, the T filter uses $R_1 = R_2 = 2\ R_3$, $C_1 =$ and $C_1 = C_2 = C_3/2$.

However, a greater notch depth is claimed for non-symmetrical circuit. ■

BETTER PERFORMANCE FOR YOUR HEATH SB650

John Ingham, VK5KG
37 Second Ave., Sefton Park, S.A. 5083

The Heathkit Frequency Display Model SB650 has proven to be one of those little luxuries that quickly turns into a necessity! The ability to accurately net to a frequency by sight alone will be appreciated by any ham who has ever kept a sked.

However, after some months of operation, several flaws became apparent in my unit which appeared to be not faults as such, but characteristic of the model in general. Conversations with several other SB650 owners confirmed this to me, and led me to investigate ways of improving its performance. In particular, the problems encountered were:

1. Overheating which led to an incorrect count whenever the unit was operated at an ambient temperature slightly higher than normal room temperature.
2. Occasional random variations in the last digits exceeding that specified by the manufacturers.

In addition, I felt that a further decade of resolution would be an advantage (i.e. to obtain a readout resolution to a 10 Hz instead of 100).

The solutions I have come up with to these problems are separate and do not rely one upon the other. For that reason I will describe them separately even though they can be tackled all together if so desired.

Heathkit specify a Maximum Ambient Operation Temperature of +40 degrees C. (112 degrees F). They also recommend against setting the SB650 on top of heat producing equipment such as receivers, transmitters, etc. Even when such advice is complied with, the average ham operating area can get quite hot, and it only takes (say) the summer sun shining through a window on the unit to lead to problems. I have measured an interior air temperature of over 155°F under these conditions, and certain components, notably the power transformer, get too hot to even touch! The cause of the overheating is obvious at a glance; the unit is enclosed in a double shield with no provision for ventillation at all. Even though it draws only 15 watts, with such good thermal insulation it is no wonder the unit gets so hot.

Heathkit engineers have obviously utilised a double shield for a purpose. However, I have had no trouble with RFI to or from the SB650 since I carried out the following modifications.

As can be seen from Fig 1 the power transformer is mounted on a bent strip of copper or aluminium bus-bar which is attached to a regular finned aluminium heat sink. The bus-bar is thermally insulated from the chassis by the use of a sheet of fish paper and no part of the box or back panel is allowed to come into contact with the bus-bar/heatsink combination.

The bus-bar (3⅜" L x 2¼" W x ¼" thick) can probably be obtained as scrap from a local electrical contractor while the heatsink is a Wakefield Engineering Inc. No. 641K[1]. Cut 9/16" off one side of the heatsink, and file the corners round so that it will fit easily into the outer case. Now remove a notch 15/16" H x ⅝" W from the bottom corner of the other side so as to preserve clear access to the LMO socket.

Remove the rear panel of the SB 650 and cut off the right hand end to match the heat sink. Now perforate the panel with ⅜" holes above and below the chassis to allow a reasonable degree of airflow. The regulator integrated circuit IC1 is re-located onto the bottom of the heatsink and re-connected to the original wires which are fed below the chassis via

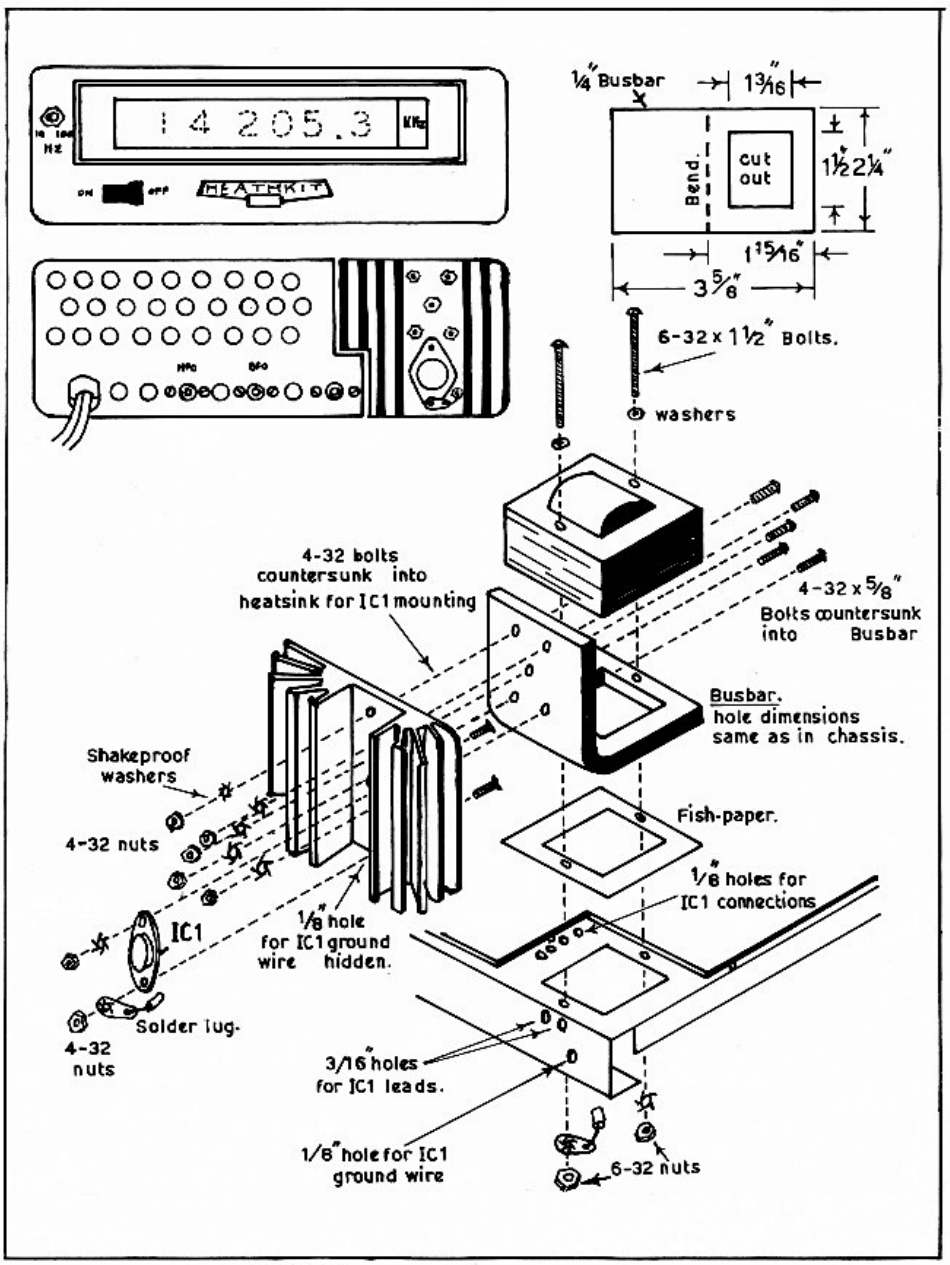


FIGURE 1

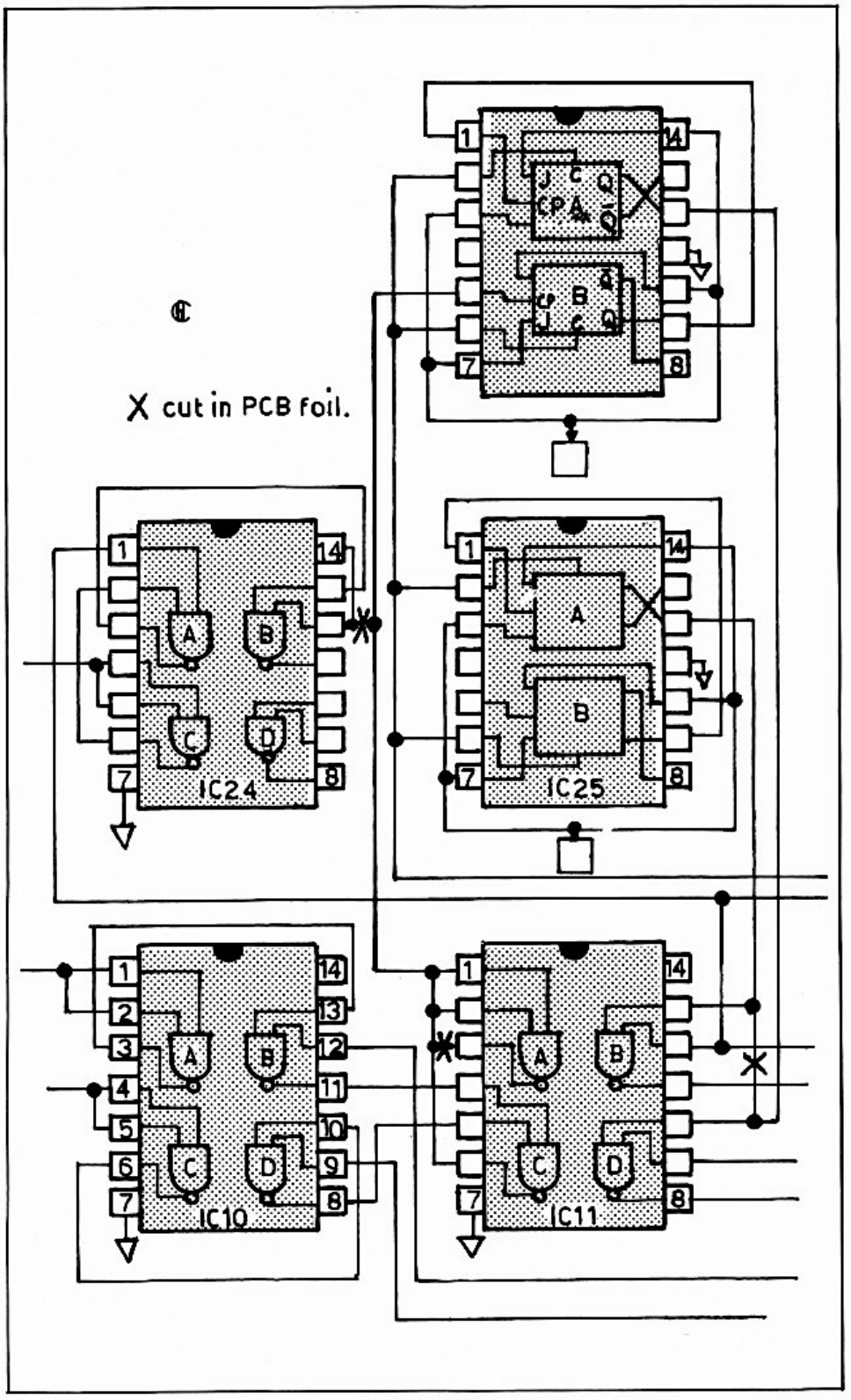


FIGURE 2A

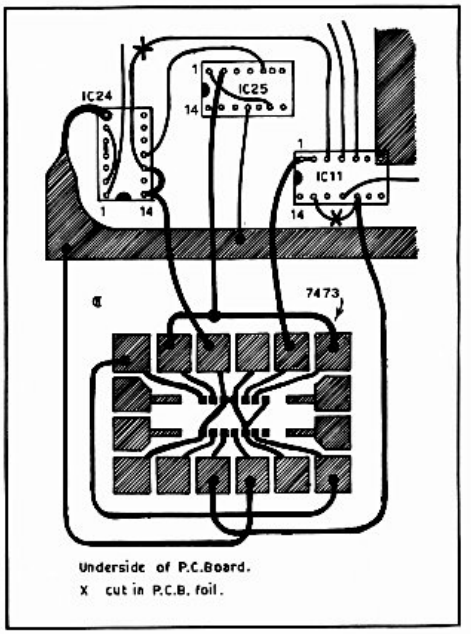


FIGURE 2B

four ⅛" dia. holes drilled alongside the power transformer.

In order to ensure a good *electrical* (as opposed to *thermal)* chassis connection for IC1, I put under its lower mounting nut a solder lug connected to a wire which passed through the heat sink and rear of the chassis (via a small hole drilled for the purpose) and grounded to another solder lug under the closest transformer mounting nut.

I recommend the use of silicon grease wherever good thermal contact is required. I used International Rectifier Silicon Heat Sink Compound No. SH 119-C.

The difference in the interior temperature of my SB 650 after these modifications was incredible and I have had no overheating problems since. However, the key to success in this matter lies with the use of the fish paper. The first time I tried, I took no particular measures to isolate the heat sink from the chassis and the results were disappointing.

When I first built the SB650, I was surprised to note that the readout would on occasion jump by as much as 500 cycles. For some time I assumed that the cause of this was other than the counter. Then one day when I was using the SB650 as a straight frequency counter (by using only the HFO input) an odd thing occurred. Whenever I fed in a frequency ending with a 9 tending to a 0 the last digit would "blur" and show all 10 figures simultaneously! When I re-connected the HFO and LMO inputs I discovered that the readout was jumping up and down by 500 cycles

The reason this effect is not often noticed in normal use is that the HFO oscillator in all Heathkit SSB rigs is crystal controlled and it is unlikely that its frequency will fall onto a number ending in between 9 and 0.

If you have experienced this fault with your SB650 (probably on one band only) you can correct the situation by slightly retuning the HFO oscillator plate coil for that band. However, I wanted to see if I could find a permanent cure for this problem. A close look at the schematic reveals that in order to count the frequencies involved, Heath have used a divide by 4 scaler.

To compensate for the reduction in frequency of the inputs, they have used a clock period of 4 times the expected rate. The readout is still correct, but the counters only have to work at ¼ of the speed!

Now although the scaler (IC25 Dual J-K

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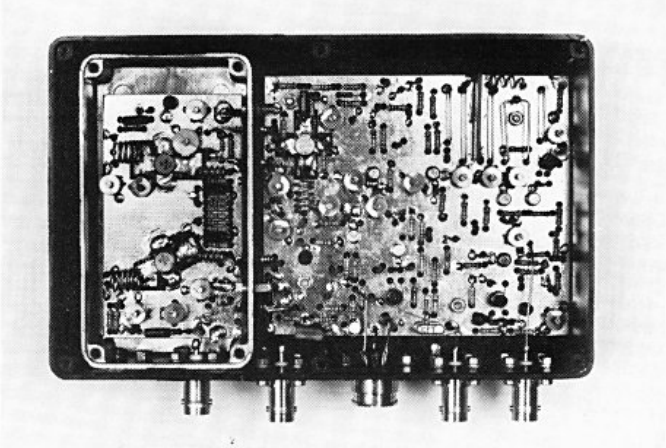
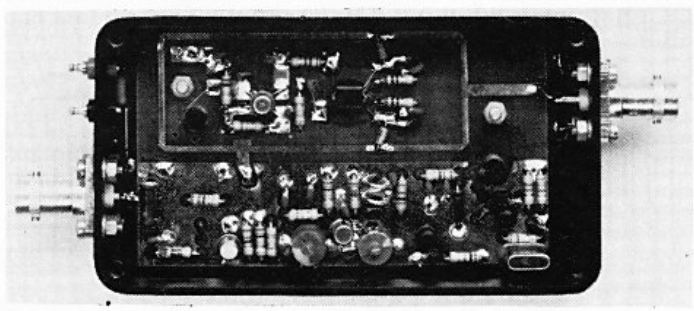


MMT432 Transverter



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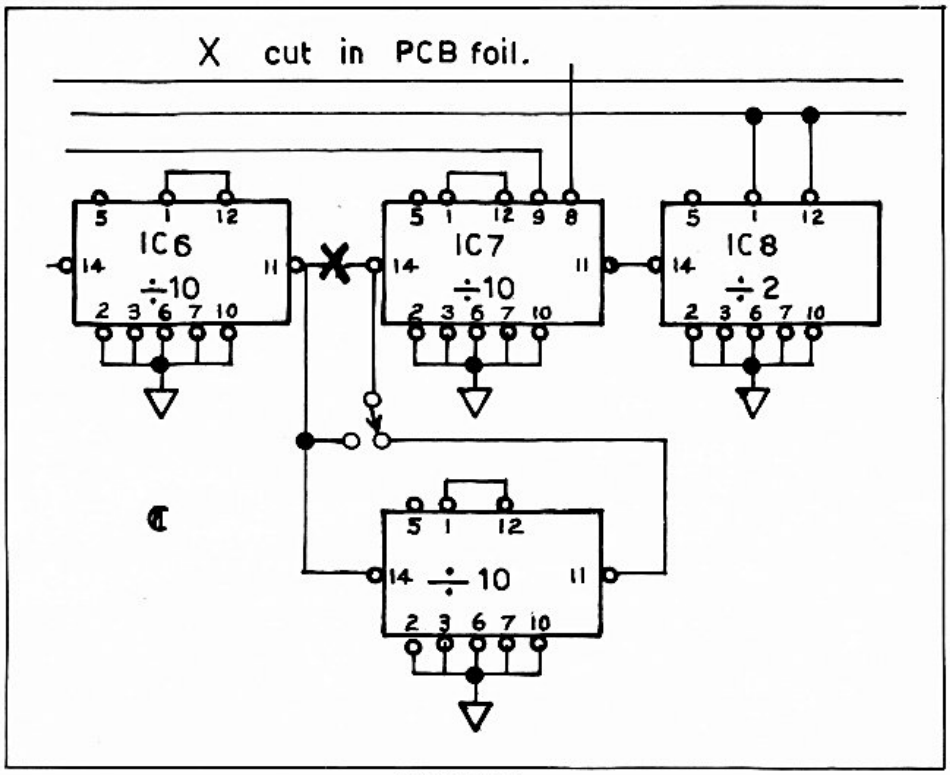


FIGURE 3A

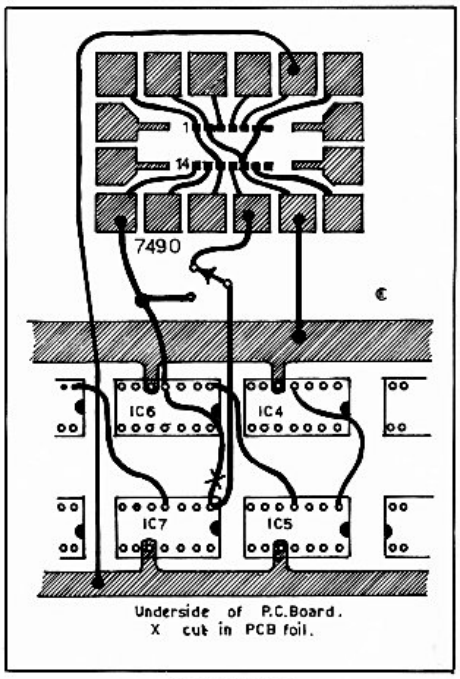


FIGURE 3B

flip flop) is reset at the end of every *complete* counting cycle, it is not reset after each up or down count. So if there is still a count "left over" in the scaler at the end of the up-count, it is still there when the scaler starts counting for the down-count.

To confirm this I connected two up-down counters (and their decades) in parallel as per IC-12; however, on one of these decades, I tied the count-down input to + 5 Volts (as specified in up-down counter SN74192N spec. sheets[2]). I then fed a signal into the HFO input of the SB650 while terminating the LMO and BFO inputs. The result was that sometimes the two decades read the same digit and sometimes the normally connected decade showed one count *lower* than the other.

I therefore concluded that a stray count was getting from the count-up circuitry into the count-down circuitry. To overcome this I undertook the modification shown in Fig 2 which in effect gives the down-counting circuitry a different divide by 4 scaler from the up-counting circuitry.

This modification worked perfectly as expected right from the beginning. The fact that it makes such a difference in the final digit stability (in both the "normal display" mode and "frequency counter" mode using only the HFO input) is proof that it should have been included in the original design.

The extra duel J-K flip flop is a SN7473, mounted on a 14 pin dual-in-line socket soldered onto a small PC board 1½" x 2⅛" (available from Tandy Electronics cat. no. 276-1803).

The PC board may be installed alongside IC11 on spacers from the chassis. The schematic and connection diagram for this modification are shown on Fig 2. The foil on the PC board has to be cut only twice, not three times as you would expect from the schematic!

The final modification is the most straight-forward of the three (see Fig 3). It involves the insertion of another divide by 10 counter between IC6 and IC7 (both divide by 10 counters) in the clock circuitry. This increases the cycle time to 1.6 secs. and the resolution to 10 Hz. The IC is an SN7490. A double pole, double throw, centre off, switch when mounted to the left of the display on the front panel may be used to select either 100 Hz or 10 Hz resolution. The centre off is useful for "freezing" a readout for recording purposes.

For those who consider the extra effort worth it, the spare set of switch contacts may be used for changing the decimal point. A small hole may be drilled through the light shield between the 2nd and 3rd decades to the right behind which a NE-2 neon may be mounted. Use a black felt tipped marking pen to blacken the edges of the hole.

The physical mounting of the extra IC poses a bit of a problem. I mounted mine underneath the chassis on the circuit board shield using the same IC socket and PC board as used in the modification above.

Although I am not particularly happy about the long leads I used to allow the circuit board shield to be opened, I have had no trouble with this circuit. In fact the modification worked immediately and has proved very handy.

I strongly recommend these three modifications to any Heathkit SB650 owner who wants increased accuracy and reliability from his unit.

REFERENCES

1. Wakefield Engineering Inc., Audubon Road, Wakefield, Mass. 01880. Semiconductor Cooling Div.
2. Or ref. Page 72 of Heathkit SB650 Assembly Manual, last sentence. ■

CRYSTAL SELECTION FOR THE FT101B

Ray Johnson VK2AVR

FOR FIXED FREQUENCY OPERATION
A much simpler method of choice than that given in the handbook follows:

1. Select desired frequency and note the reading of the tuning dial — black scale only.
2. Subtract the dial reading from the high value of the internal VFO (9200 kHz). This gives the mean value of the crystal.

3. For LSB operation add 1.5 kHz. For USB operation subtract 1.5 kHz. For AM/CW subtract 0.7 kHz.
4. The chosen crystal will operate on all bands at the same equivalent scale position.

EXAMPLES

80m Band. Chosen frequency is *3.592* MHz, crystal value = 9200-92 = *9108* kHz (it would also give 7.092 MHz on the 40m band) for LSB operation, value = *9109.5* kHz.

20m Band. Chosen frequency is *14.210* MHz. Crystal value = 9200-210 = *8990* kHz. (It would also give 21.210 MHz on the 15m band, and 27.210 MHz on the 11m band). For USB operation, value = *8988.5* kHz.

DETERMINATION OF BAND CRYSTAL

If it is desired to substitute one of the bands for listening purposes, the crystal for the new band can be found from the following information:

Fixed IF = 3.18 MHz.

Internal VFO = 8.70 to 9.20 MHz.

That is: 1st (variable) IF = 8.70-3.18 = *5.52* MHz, to 9.20-3.18 = *6.02* MHz.

Hence, band crystal value = band range limit plus IF limit.

EXISTING INSTALLED CRYSTALS

EXAMPLE 1 — 80M BAND

Range = 3.50 to 4.00 MHz.

Band crystal:

(a) 3.50 + 6.02 = *9.52* MHz.

(b) 4.00 + 5.52 = *9.52* MHz.

EXAMPLE 2 — 15m BAND

Range = 21.00 to 21.50 MHz.

Band Crystal = 21.00 + 6.02 = *27.02* MHz.

If, for example, one wished to substitute range 2.50 MHz to 3.00 MHz for a little used band, the new band crystal would be 2.50 + 6.02 = *8.52* MHz. ■

TUNE TO 40 METRES, MY WAY

David S. Down, VK5HP

If we are all agreed that it is primarily the antenna system which "makes or breaks" a good QTH, then we can learn much from 5HP's successful antenna development.

Although only licensed in July this year, my experience in operating CW and associated antennas goes back to 1964 when I joined the RAN. As a CW ship to shore operator, I was spoiled, Collins 5 kW TX, Racal RA17 RX, two log periodics and full-size rhombics switchable every 15 degrees were all at my fingertips.

From the sublime to the ridiculous, and my first 5HP transmissions were with a vertical and a horizontal dipole. Not wishing to outlay lots of pennies on gear, I started hunting for antenna inspiration, and with the assistance of articles on the VK2ABQ Triband Beam, I found it!

RIBBON ELEMENTS

At the time I had developed a 2 element quad for 40 metres utilising 300 ohm TV ribbon for both elements, thus maintaining the quad at the same size as a 20 metre single conductor version. I was sorting out spider boom construction problems and rotation difficulties, the quad being back on the ground for maintenance (after working very well). This left me without the gain-providing and directional antenna I wanted for 40 metres. Along came the VK2ABQ article.

Mr. Caton, I do apologise for what I have done to your original antenna, but mine works too!

The VK5HP 40 Metre Beam takes about 2 hours to build, costs about thirteen dollars all up, and can be turned by hand or by rotators such as the Stolle (which I am using).

I will assume that anyone still reading this article is sufficiently interested in antenna development to ensure that they have a copy of the VK2ABQ Beam details (as in Electronics Australia, October 1973).

CONSTRUCTION

Four Rangoon canes, properly weatherproofed, are fixed by U-bolts to a 15" by 15" square of ¾" marine plywood in the familiar X-beam configuration. The canes are standard fishing rod blanks as used in some quad constructions.

Four lengths of 300 ohm TV ribbon are required for the elements, which initially form a square 17' 5" per side and secured to the cane tips. Either open or standard ribbon can be used, but ensure that whichever it is, it is firmly secured to the canes and kept from twisting.

The next step is to measure exactly halfway along one side and cut the ribbon to create the feedpoint. Feeding can be with 300 ohm ribbon, 600 ohm line, or coaxial cable plus balun. I used an antenna tuning unit with the ribbon feed at first, and it worked just as well as the coax feed used at present.

Both the sides of the X-beam square *adjacent* to the feed point side, *not* the side *opposite,* are also cut exactly midway along, and two pieces of standard tagboard, each of two lugs per side, are used as insulating spacers. One insulator is inserted in each of the two cut sides, ensuring that each side is divided in two by folding the now exposed ribbon ends together and soldering to the tagboard lugs. Precise adjustment is done with the aid of a GDO, and an assistant, if possible. All tuning at this QTH was done with the antenna atop my experimental 30 ft. tower.

PERFORMANCE

The SWR across the 40 metre band (CW end anyway!) is better than 1.5:1, and to date I have regularly and reliably worked Japan, USA, Canada, VK2, VK3, VK6 and ZL on 40 CW with RST reports ranging from 449 (JH6URN) to 599 (VK2YK) and all transmissions have been with 15 watts input or less!

As with everything, there has to be the *bad* news. So there is with this Forty Metre X-Beam — it also works well on

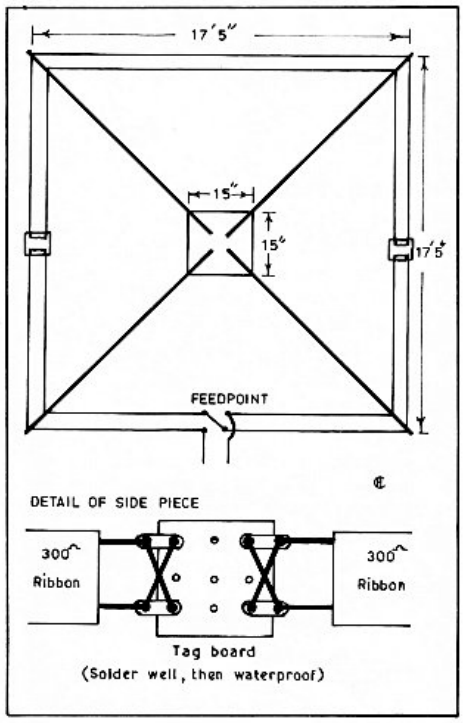


FIGURE 1

Twenty! During November 1975 (the time of writing this article) using the same antenna without modification on 20 metres CW, 3 watts output, from a good takeoff, I have experienced DX pile-ups from which up to 22 stations have been worked in a string, including JA, UA, G, YB, DJ, HA, HB, UT, UC, OH, UB, OE, DL and DK and K/W lands. It almost makes me hesitant to re-install the 40 and 20 metre 2 element quads!

Anyway, the purpose of the exercise has been achieved; namely, a gain-providing, directional antenna for 40 metres (with the 20 m bonus) that is cheap and easy to construct, can be readily manhandled up and down towers and ladders, yet still leaves room for the perfectionist to improve upon. Anyone for stacked 40 metre X-beams?

In conclusion, to those who run full power to multi-multi-element arrays turned by Ferguson tractor engines, may I suggest that you do not know what fun you are missing out on! See you on forty. ■

THE LM3900 PHASE LOCKED LOOP

M. R. Haskard VK5BA
64 Malvern Ave., Malvern, S.A. 5061

The Phase Locked Loop (PLL) has many possible applications for amateurs. This article summarises the performance that can be obtained from the LM3900 when connected as a PLL.

Recently, students of the South Australian Institute of Technology carried out a number of experiments on PLLs using the LM3900 IC. According to National Semiconductor's Linear Application Note AN46, the LM3900 is suitable for PLL applications to 10 kHz.

What is a PLL? It is a circuit which produces an oscillation which is locked to a reference signal. If the phase of the reference varies, the locked oscillator's phase is varied in sympathy. The two run at the same frequency. Refer to Fig 1 (a).

The addition of a mixer circuit would enable, say, a 144 MHz signal to be locked to a 5 MHz signal. Because the mixer is isolated from the locked VHF oscillator, no mixer chain or 5 MHz components appear in the output. So PLL systems can be used with highly stable, clean, single conversion VHF receivers, transmitters etc. as shown in Fig 1 (b).

The PLL can also be used to decode RTTY signals. As no tuned circuits are used, the frequency shift of the RTTY signal is unimportant.

The circuit used by the students is shown in Fig 2.

SPREAD IN PARAMETERS

For the circuit in Fig 2, table 1 summarises the results of 6 separate units constructed. Test conditions are $V_S = +12$ volts and $V_{IN} = 1$ volt. The free running frequency of the voltage controlled oscillator (VCO) *is with the input disconnected.* The output of the comparator, under these conditions, goes to a high state (approximately 11 volts out) and the VCO runs at a high frequency — near the top end of the lock-in range.

f_{VCO} Hz	Lock in range Hz	Capture range Hz	DC Current Drain mA	K_P = Phase Comparator Transfer Characteristic Volts / radian	K_{VCO} = VCO Transfer Characteristic radian/sec/volt
400	218 – 376	192 – 400	6·4	-1·86	340
455	220 – 460	247 – 410	6·0	-1·59	564
480	250 – 470	300 – 420	6·3	-2·0	420
571	345 – 572	370 – 556	6·7	-1·85	433
685	339 – 685	408 – 616	6·2	-2·0	436
833	526 – 833	555 – 704	7·9	-2·5	416

$V_{SUPPLY} = +12$ VOLTS $V_{IN} = 1$ VOLT

TABLE 1

V_S SUPPLY VOLTAGE VOLTS	VCO FREQUENCY Hz	LOCK-IN RANGE Hz	CAPTURE RANGE Hz
7·5	550	269 – 550	306 – 498
10	558	316 – 503	316 – 503
12	562	272 – 561	319 – 509
14	550	276 – 550	320 – 509

$V_{IN} = 1$ VOLT

TABLE 2

OUTPUT VOLTAGES

Typical output voltages are shown in Fig 3. Output Vo2 is inverted.

LINEARITY

The linearity of the comparator and the VCO was investigated. The comparator output fell linearly from 10.2 volts to 5.2 volts for a change in phase between the two inputs from 0 degrees to 180 degrees.

The VCO was also found to be very linear. The control voltage was varied from 1 to 20 volts; this produced frequencies from 20 Hz to 890 Hz.

INPUT SIGNAL LEVEL

When the LM3900 is operated from a 12V rail the input signal may be between 0.3 and 20 volts. If greater sensitivity is required, the fourth, unused amplifier in the LM3900 package could be pressed into service. The frequency of the locked oscillator is unaffected by input signal variations over the whole of this large range, although small variations may occur.

TEMPERATURE EFFECTS

The circuit was heated to 50°C in an oven and variations in the VCO frequency, lock-in and capture ranges noted. The supply rail was 12 volts and input signal 1 volt. As the temperature was increased from 20°C to 50°C the centre frequency fell from 335 Hz to 295 Hz. The capture range and lock-in range both remained relatively constant.

NOISE IMMUNITY

The student investigating the response of the PLL for varying input S/N ratios (white noise) did not complete this section. As expected the PLL gave every indication of operating satisfactorily in poor S/N conditions.

In the case of impulse noise, some results were recorded. For a 1 volt input signal there appeared to be a noise threshold voltage of 0.9 volts below which the PLL remained essentially in lock. When the impulse noise level was above this threshold voltage, the PLL preferred to

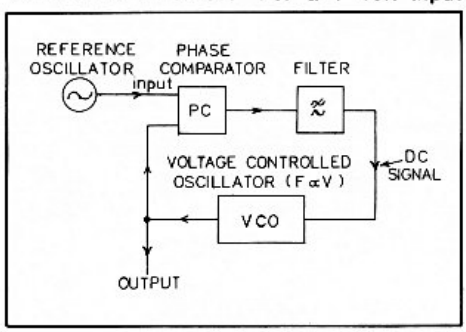


Fig. 1A: PLL Block Diagram

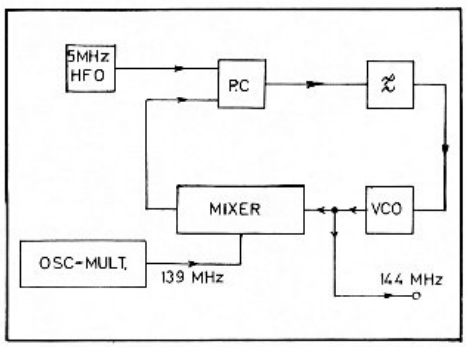


Fig. 1B: VHF PLL Block Diagram

lock onto the impulse noise signal. The impulse noise was simulated using a pulse generator, manually varying (independently) the mark to space ratio from 1:100 to 5:8 and frequency over the range 10 Hz to 10 MHz.

FREE RUNNING FREQUENCY OF THE VCO

National Semi-conductors state that the frequency of the VCO is —

$$f_{VCO} = \frac{I_1}{2C_1 (V_H - V_L)}$$

Where . . .

V_H is the peak voltage of output Voltage V_{O1}

V_L is the valley voltage of output Voltage V_{O1}

$$I_1 = \frac{V_C - V_{BE}}{R_1}$$

V_C being the high output voltage from the comparator

V_{BE} the base emitter voltage of a silicon transistor.

For operation from a 12 volt supply typical values are:

V_{BE} = 0.7 volts, V_H = 10.7 volts, V_L = 1.2 volts

and V_C = 10.7 volts.

$$\text{Thus } f_{VCO} = \frac{1}{1.8\, R_1 C_1}$$

Using the values given in figure 1 namely R_1 = 1 Mohms, C_1 = 1000 pf

f_{VCO} = 555 Hz (compare values f_{VCO} given in table 1).

The free running VCO frequency can be changed by varying R_1, and/or C_1, the

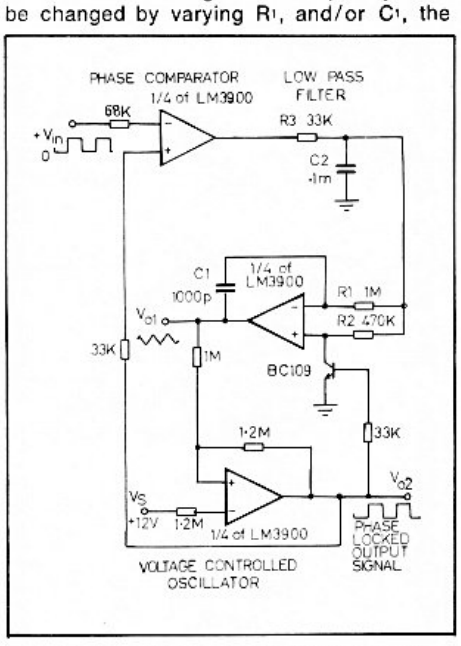


Fig. 2: Circuit Under Investigation

only limitation is that if R_1/R_2 is not 2, the mark to space ratio of the output voltages V_{O1} and V_{O2} depart from 1:1. Tests indicated that by varying the R_1C_1 term, the PLL could be made to operate from below 10 Hz to over 10 kHz. Above 11 kHz, the

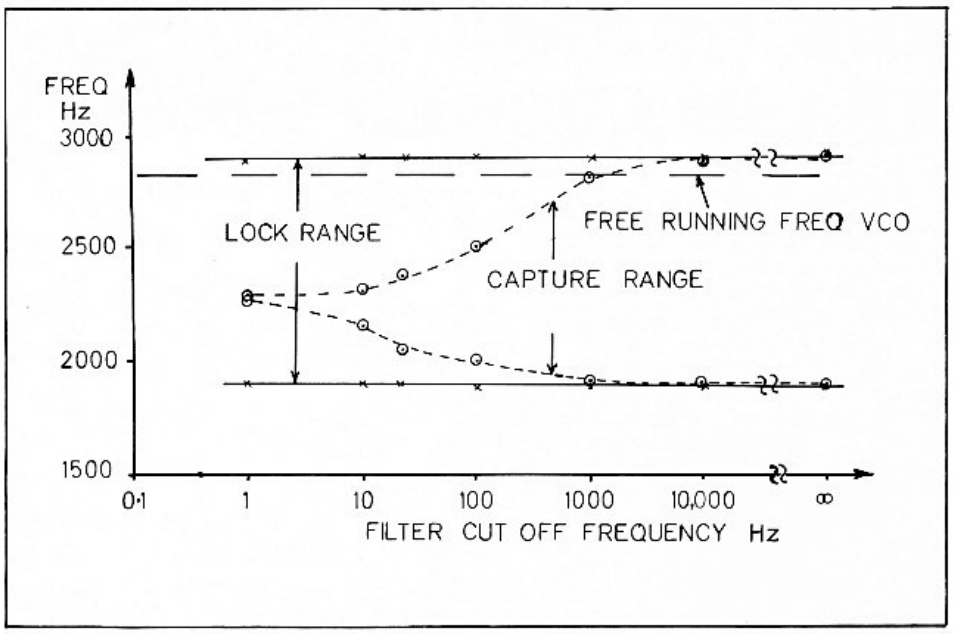


Fig. 4: Effect of changing cut off frequency of low pass filter

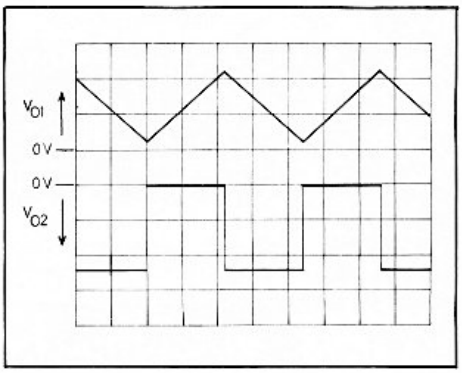


Fig. 3: Y Axis 5V/cm x Axis .5 m sec/cm

circuit would not operate correctly, the limitations being the switching time of the amplifiers.

CUT-OFF FREQUENCY OF THE LOW PASS FILTER

Changing the cut off frequency of the low pass filter does not affect the lock range, only the capture range. The latter decreasing as the cut off frequency is lowered. For no filter present the lock and captive ranges are identical. Decreasing the cut off frequency of the filter increases the tune to lock-in, improves the interference rejection of the circuit, but degrades the transient performance of the system.

Fig 4 shows the effect of changing the filter cut off frequency. In the circuit used C_1 = 150 pf, R_1 = 1 Mohms, R_2 = 470 Kohms, R_3 = 33 Kohms, and C_2 made the variable. (See Appendix).

APPENDIX

From "Phase locked loops" Signetics applications note:

$$W_L = 2\, K_V = (K_P\, K_{VCO})$$

$$W_C = 2\, K_V F\, (j w_C) \sqrt{\frac{K_V}{I_1}}$$

$$\frac{1}{I_1} = R_3 C_2$$

Where . . .

W_L is the lock in range (full) in rod/sec

W_C is the captive range (full) in rod/sec

K_V is the loop gain

K_P is the phase comparator transfer characteristic

K_{VCO} is the VCO transfer characteristic

From table 1 the average values for K_P and K_V are (K_P) = 1.97, (K_{VCO}) = 435 AVG AVG

Thus W_L = 1754 rod/sec or f_L = 268 Hz

and W_C = 738 rod/sec or f_C = 116 Hz

These results agree favourably with the re-assured ranges given in table 1. ■

TRY THIS

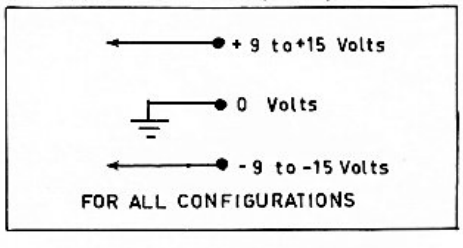
Ron Cook, VK3AFN

Bill Rice, VK3ABP

EXPERIMENTAL COMPRESSOR

Figure 1 shows the circuit diagram of a compressor I built some time ago in breadboard form. The output-input characteristic shows a steep knee, and gain is reduced rapidly when the input exceeds 50 mV rms. Increasing the input from 100 mV to 500 mV increased the output from 1.80V to 1.95V. Figure 2 shows a preamplifier suitable for crystal microphones with input impedance of 2 megohms and gain adjustable from 0 to 25. R may be reduced if gain is excessive or increased if insufficient.

Figure 3 shows an alternative pre-amplifier with an input impedance of 4.7 K for dynamic microphones. Gain is adjustable from 1 to 100. Altering R1 will change the upper limit. Both preamplifiers have



some low frequency cut below 300 Hz.

Amplifiers used should be I.C. operational amplifiers of XX741 type.

The output of the compressor amplifier is rectified by the diode D. For signals below 1.2V the 2N3643 transistor receives very little base current and its collector-emitter resistance remains high. For larger output signals the base current increases, the collector-emitter resistance decreases, causing the transistor to produce a shunting effect on the incoming signals. This effectively reduces the circuit gain thus providing AGC or compression action. No collector supply is required for the transistor to operate in this circuit. ■

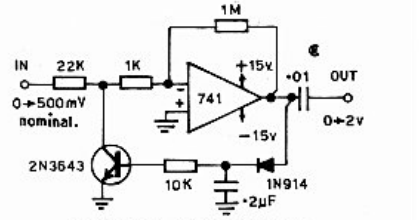


FIGURE 1. COMPRESSOR.

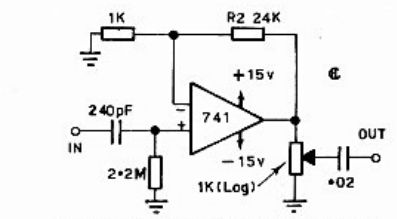
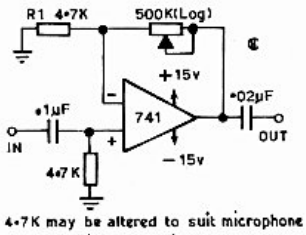


FIGURE 2. "CRYSTAL" PREAMPLIFIER.



4·7K may be altered to suit microphone

FIGURE 3. "DYNAMIC" PREAMPLIFIER

A CHEAP AND SIMPLE EFFECTIVE NOISE BLANKER

The need arose recently, after shifting QTH, to get rid of some really heavy QRN created by 33kV power lines.

Each time the wind blew, the noise flattened the 6 metre receiver. Here presented is a circuit gleaned from an early RSGB publication, which produces good results for its simplicity.

Steve Gregory VK3ZAZ
19 Charles St., Surrey Hills, Vic.

The unit was fitted to a valve receiver type FR50 and so is presented as a valve unit (!), however, to FET convert would be simple as you see from Fig 1.

Construction was straightforward and the unit was fitted on the rear of the chassis. All signal leads are coaxial cable, power leads are conventional. I used the 150V from the receiver oscillator line. AGC is applied to the amplifier valve, V1, and the range of operation is excellent for all signal and noise levels.

The threshold potentiometer was a 25k switch pot, located on the front panel and effectively sets the level of noise clipping. On a weak signal the threshold may be adjusted until a buzz appears; below this level if you still have power noise, then nothing will stop the QRN. I took the input from the anode of the 1st Mixer stage at 5.2 MHz, amplified it through the 6BA6 using a standard 5.2 MHz transformer from the Yaesu range. The output was fed to the anode of the 1st 6BA6 in the 2nd IF chain.

The noise pulses coming in are amplified by V1 and rectified by D1 and D2 to produce negative amplified pulses at the grid of the 1st triode, V2. In turn these are inverted and fed to the grid of 2nd triode, V3, which conducts on impulse, and effectively shorts the IF amplifier anode to ground by way of the .001 coupling capacitor and diode.

Diode D1 develops a bias in the presence of a signal and conducts when a pulse exceeding this signal arrives. Diode D2 is capacitively coupled so as to allow only the negative transient pulses through to V2. It shares the bias developed by D1 thus preventing blanking operation on the signal instead of on the noise.

The potentiometer forward biases the diode D3 and effectively sets the threshold level for blanking.

The "holes" left by the noise pulses are more readily accepted by the human ear than the pulses themselves.

If you have bad QRN and do not have an FT101 with a blanker, try this, it could make things more bearable. ■

Fig. 1: Noise Blanker Circuit

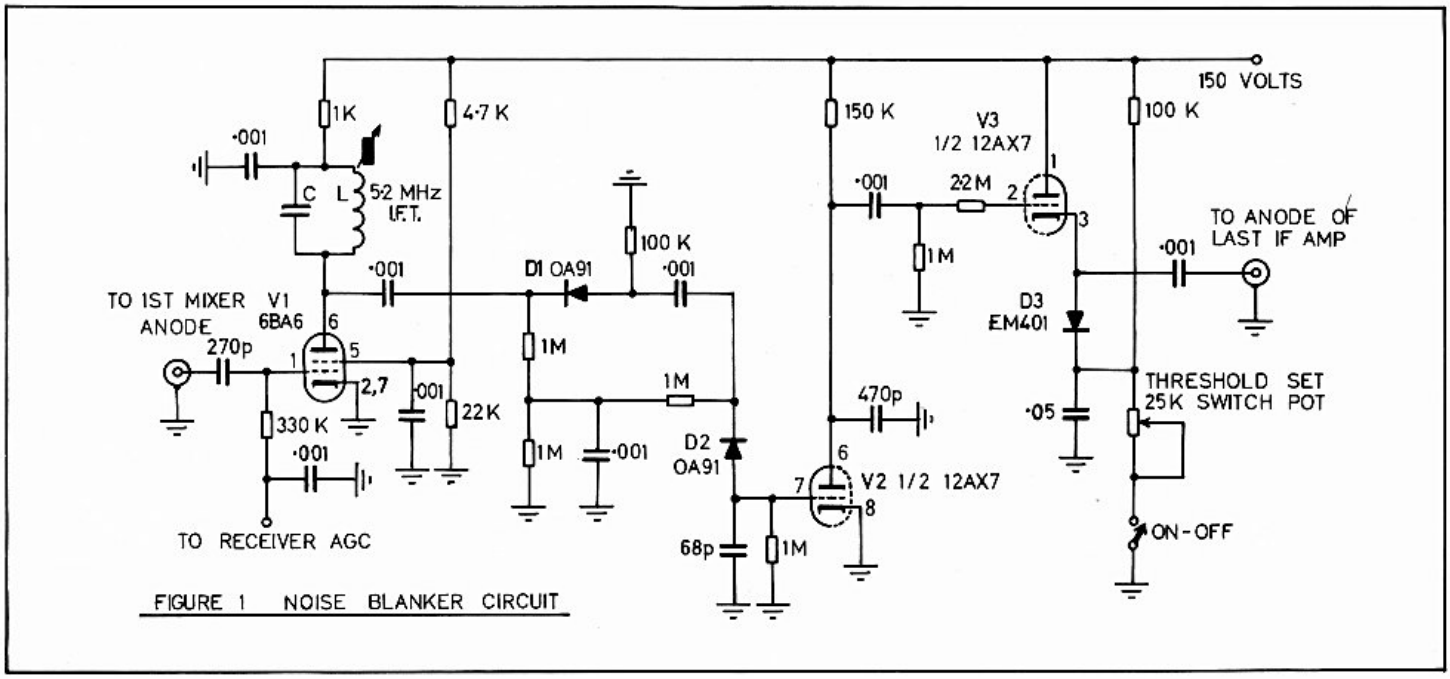


FIGURE 1 NOISE BLANKER CIRCUIT

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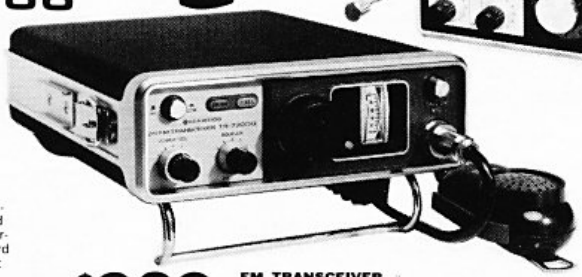

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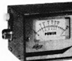

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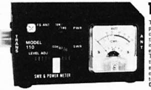

This Meter and Field Strength Indicator is a handy and compact device for amateur and professional use in checking the operation of a transmitter. The bridge method of comparing the power supplied to and reflected from the antenna system is utilized for SWR measurements. For RF power measurements, the average voltage from the carrier detector is measured. The calibration of the RF power meter is so adjusted to fit the 50 ohm line impedance. The 10 or 100 watt range can be easily selected by the front slide switch. Continuous monitoring of the transmitter output is possibly by leaving the instrument in the circuit at all times.
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20,15 & 10 metres, 3 element beam with 14 foot boom. Average gain 8.5dB, hurdles up to 1KW RF power.
Cat. D-4306 .. .. $195.00

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20,15 & 10 metres, 6 element beam – THE BIG ONE. Top performance, maximum gain. Fantastic front to back ratio. Handles up to 1KW RF power, best quality materials.
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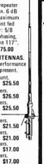

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RM-15 Resonator for 15 meters.
Cat. D-4162.. .. .. $21.00
RM-11 Resonator for 11 meters.
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Dynamic - Moving Coil - Omnidirectional - 300 – 5 kHz. Designed especially for AM & SSB transceivers supplied with 5 wire 2 meter lead that will adapt to any transceiver – even units with electronic switching.
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VK-ZL CONTEST RESULTS FOR 1975

AUSTRALIA PHONE

Call	80	40	20	15	10	Total
VK1FT	—	1530	3655	2655	1080	8920
1AOP	—	565	3755	1430	435	6185
1MF	310	220	1075	765	460	2830
1LF	365	—	465	1485	—	2315
2XT*	885	2175	8585	5695	1325	18885
*plus 190 on 160 Mx.						
2APK	805	4110	7975	4460	—	17350
2ARA	1015	1365	4055	3420	—	9855
2ABC	—	—	5775	—	—	5775
2ASC	—	—	3085	655	290	4030
2AHH	—	—	2135	810	—	2945
2OW	—	—	3130	1615	—	2895
2SG	—	—	1540	—	—	1540
3ARY	675	1260	4980	2715	—	9630
3SM	190	290	3865	1220	300	5865
3XB	1340	100	—	—	—	1440
3WT	—	—	860	250	—	1110
3VQ	—	—	55	165	—	220
4AAU	320	775	7640	4860	995	14590
4VU	700	975	8025	4075	575	14350
4UR	—	110	7360	3010	1055	11535
4LX	485	1250	6725	2545	400	11405
4EZ	—	—	9075	2145	—	11220
4PJ	—	—	4210	375	640	5225
4DO	—	—	4360	—	—	4360
4RF	—	—	2790	330	—	3120
4XA	—	—	—	2790	—	2790
4SF	—	—	—	—	1675	1675
4UU	—	—	1570	—	—	1570
VK4QA	300	—	765	—	—	1065
VK5WV	—	890	5490	1670	970	9020
5RK	—	—	—	390	—	390
VK6CT	—	—	—	10425	—	10425
6TU	720	100	2060	1600	—	4480
6II	310	250	2250	1010	—	3820

NEW ZEALAND PHONE

Call	80	40	20	15	10	Total
ZL1BKX	1355	5340	9420	5090	—	21205
1AIZ	1820	3270	4135	2575	850	12650
1BLS	11695	—	—	—	—	11695
1AKY	700	3030	1660	4845	875	11110
1ANH	—	—	11075	—	—	11075
1PN	—	—	8875	—	—	8875
1AMM	855	385	4115	2280	—	7635
1VD	1315	1530	1825	2370	290	7330
1MQ*	220	545	2520	1430	155	5025
*plus 135 on 160 Mx.						
1AQO*	1645	—	—	—	—	1970
*plus 325 on 160 Mx.						
2AJB	—	—	—	5565	1700	7265
2AH	6190	—	—	—	—	6190
2ACP	1865	—	—	—	—	1865
2HE*	—	—	—	—	—	620
*plus 620 on 160 Mx.						
3GG	1600	1345	4065	865	275	8150
3RD*	375	230	2810	55	—	3570
*plus 100 on 160 Mx.						

AUSTRALIA — CW

Call	80	40	20	15	10	Total
VK1AG	300	490	760	420	225	2225
VK2APK	110	4035	5395	4065	950	14555
2GW	210	2730	3455	3460	—	8495
2CX	—	555	5515	1860	—	8495
2SG	665	3965	2180	810	—	7620
VK3FH	980	2565	4995	3680	545	12765
3JI	210	1145	6540	—	—	7895
3APN	—	4490	—	—	—	4490
3MJ	315	1015	875	1255	175	3635
3OP	1250	2155	—	—	—	3405
3MR	3195	—	—	—	—	3195
3XB	955	630	970	—	—	2555
3FC	—	560	245	365	—	1170
VK4XA	500	3400	5005	3255	875	13035
4HE	—	5065	—	—	—	5065
4UR	1150	3325	—	—	—	4475
4RF	—	—	—	—	—	3750
4EZ	—	—	1090	—	—	1090
VK5SW	—	480	560	500	—	1540
VK7RY	340	830	275	—	—	2760

NEW ZEALAND — CW

Call	80	40	20	15	10	Total
ZL1BJH	7875	—	—	3740	—	11615
1AIZ	1755	2830	3180	2935	830	11530
1BLS	—	—	9385	—	—	9385
1AMM	610	1095	3645	2865	—	8215
1HV	730	2250	2855	1720	315	7870
1AFW	—	700	2670	1100	—	4470
1MQ	220	210	2900	495	—	3830
ZL2CD	—	—	1940	4660	—	7200
2ACP	—	—	6250	—	—	6250
2AGY	—	—	6195	—	—	6195
2OM	1520	—	—	—	—	1520
ZL3GQ	1190	5025	4925	1735	260	13125
3GG	1310	510	160	1130	260	3375

PHONE

ASIA

JA1ELY	9485	JA4BKI	9078
JA1IST	3916	JA4ENY	4420
JH1CNT	2784	JH4BTX	858
JE1MLK	2736	JA4EE	424
JA1HUS	2484	JH4ARN	90
JA1LDJ	1089	JH4KEB	12
JF1QJD	480	JA6MPJ	6472
JA1EQH	238	JA6DPU	1872
JA0BMS/1	196	JA6EFT	328
JA1AAT	160	JA6EYD	135
JH2MYN	3024	JA7FAS	3980
JA3EVN/2	913	JA7ZF	3956
JA2BNN	273	JA7GAX	637
JR2BDG	272	JA7ARW	120
JA2XH	156	JA7KM	24
JA2ATE	70	JA8MS	2388
JA3YAW	2204	JA81XM	1010
JA3AAW	5070	JA8BEV	24
JA3CMD	2196	JA9BOH	224
JA3ELU	1615	JA01AM	1078
JR3CQC	1296	JA0KUP	423
JH3JUB	1260	JA0AGN	336
JA3XRC	204	JA0FMB	100
JR3BLV	186	VS6AF	927
JA3BX	168	9M2FK	912

EUROPE

EA3NA	600	OK3KAP	6
DL8NU	4347	OZ5KF	5539
DL8PC	1819	OZ6RT	2030
DL1KB	660	OZ1ZE	21
G3NAS	906	SM3CXS	2847
GW3NNF	300	SM2DMU	640
G6XN	100	SM4DQE	312
I3MAU	2318	SP3DO1	924
IT9WGI	369	SP6PZB	440
JW5NW	70	SP5BT	336
LA1KI	3840	SP7HT	270
LA4TG	63	SP9CTW	98
LZ1QOV	573	SP9EVP	54
OH6KT	4800	SP9KRT	32
OH7OK	1904	SP9AI	16
OH1NM	630	YO3AC	616
OH7NW	140	YO3RF	380
OH2BPI	112	YZ1BCD	24
OK1TA	198	YZ2HDE	2
OK2BOB	84		

NORTH AMERICA

HP1KC	210	W8FJS	32
TI2WX	576	W9YWB	1250
W2FCR	455	W9LKI	252
W4WSF	4347	W9RKP	192
WA4EYR	3197	WA2WMT/0	13845
W4ORT	1501	W0EEE	2580
WB6AZK	210	W0IVB	1120
W6RQZ	110	YS1GDD	605
K3MNT/7	2432	YS1JWD	1380

SOUTH AMERICA

LU2AFH	704	PY1FI	150
PY2ELV	450		

OCEANIA

KH6IJ	12749	VR1AA	32062
P29MJ	18784		

AFRICA

9J2GJ	256

USSR

EUROPEAN SSR

UV3CE	2415
UA1CS	1353
UA4FAR	740
UW3EH	440
UA4RZ	400
UA3VAQ	272
UW1AE	126
UW3EQ	108
UW1YY	85
UA3ST	48
UA6JAD	30

ASERBAIJAN

UD6DER	495

UZBEK

UI8CD	455

TADZHIK

UJ8JGJ	144

ASIATIC SSR

UW9WR	4123
UA0FBZ	3568
UV9PP	3472
UA0MI	1989
UA900	1936
UA9UF	1365
UV0EX	900
UA9FU	336

UKRAINE

UB6WE	1677
UB5MBY	968
UB5VAA	80

KAZAKH

UL7YR	660
UL7QH	72
UL7PBY	20

MOLDAVIA

UO5AP	24
UO5BZ	2

ESTONIA

UR2QD	552
UR2RJ	240

MULTI-OPERATOR

UK3AAD	3542
UK6LGA	1728
UK3AAI	810
UK3QAA	720
UK3WAC	675
UK3ACM	140
UK0LAB	5202
UK0FAJ	4009
UK0FAA	1989
UK90AD	1210
UK9OAE	530
UK9YAR	40
UK5QAV	880
UK5WAZ	2
UK5QBE	
UK7LAH	1066
UK7PAL	399
UK7GAL	288
UK2BAS	1872
UK2PAF	648

SWL

UA4-09543	2112
UA4-148173	1920
UA3-143198	1586
UA9-154940	1424
UA9-154549	1266
UA3-155150	558
UPZ-038453	540
UA9-165622	420
UB5-0731504	24

CW

ASIA

JA1YFL	9164	JA3YAW	1530
JE1SSE	8680	JH3AIU	1558
JA1YFL	8100	JA3ARM	621
JA1CMD	7722	JH3ARL	90
JH1LKH	2832	JA3YEJ	18
JA1LB	1152	JA4EE	252
JA1LDJ	890	JA4DZ	196
JA1KFH	550	JA5HCV	3094
JF1QJD	480	JA5NON	826
JA1HP	189	JA5NAF	4
JA1BNW	180	JA6AKW	9
JG1EEE	413	JA6GPR	9
JA1BSU	432	JA6TQ	2
JA1TIX	120	JA7MJ	5760
JH1CJL	32	JA7DOT	3340
JA1KQX	27	JA7KXD	2825
JF1NCT	10	JA7CDV	2553
JA1AAT	4	JA7GAX	812
JH1OEL	2	JA8MS	2388
JA2CPD	7037	JA8SL	222
JA2HLX	1729	JA9APS	10404
JA2LHG	1729	JA9CWJ	624
JR2BDF	392	JA9AQE	496
JA2CGH	288	JA01AM	1235
JA2BI	282	JA0MJ	1210
JA2BNN	138	JA0AIE	672
JA2RER	96	JA0VFM	70
JA2EKR/3	7430	JH0BBA	10
JA3AAW	5070		

EUROPE

DL8NU	1692	HA0KLE	637
DM2BJD	876	LZ1QO	882
DK5VO	120	LZ1KAU	44
DL1YA	2	LZ1KBG	24
EA4BV	6	OH7OK	400
G3DYY	300	OH6JG	329
G3HCT	252	OH1PS/2	189
HA1KSA	612	OH2BAH	144

OH7NW	32	SP3DOI	576
OH3XZ	18	SP7HT	468
OH6JW	8	SP7CTY	98
OK3KFO	50	SP9CTW	84
OKZKR	32	SP9EVP	84
OK1DVK	2	SP8ECV	80
OK1KZ	2	SP9AI	80
OK2PGU	2	SP9KRT	24
OZ1LO	1110	SP5SIP	12
OZ7HT	120	SP2BMX	8
OZ5DX	364	SP6FV	4
OZ5ME	10	SP6DB	2
PA0DIN	8	YZ1BCB	690
SM7ANB	400	YZ2HDE	12
SM0CCE	176		

NORTH AMERICA

W1EVT	5820	W6BH	522
W1WY	105	W7SFA	18315
W2LWI	3591	W7IR	12240
W3TV	85	K3MNT/7	1008
W4WSF	315	W9WYB	1326
W5SOD	60	W9LKI	126
WA6EPQ	13284	W0EEE	2580
W6PLH	12200	VE3GCO	52
W6KYA	2016	XJ6APN	24
WA6DEI	1314	VP2MB	72
W6DGH	1120		

SOUTH AMERICA

PY2GVQ	364	LU8BAO	101
LU8ADK	960		

OCEANIA

KH6IJ	11928	VR1AA	24559
KH6IFU	104		

USSR

EUROPEAN SSR

UA1CS	924
UW3HV	460
UA3QAQ	210
UW1YY	120
UA4FAR	80
UA4IB	60
UA3NB	50
UA6HV	45
UV3WT	36
UA1ZV	2

AZERBAIJAN

UD6BQ	264

TASHKENT

UI8B1	240

ZAKH

UL7QH	2369

KALINGRAD

UA2FAT	64

UKRAINE

UB5LAY	720
UT5LN	44
UB5VAA	8

ASIATIC SSR

UA9JAA	871
UA9NN	626
UA900	539
UA0FCK	528
UA0SAU	344
UW9WL	202
UA9UF	100

MOLDAVIA

UO5AP	50

LITHUANIA

UP2NC	48
UP2BAU	8

ESTONIA

UR2RDQ	414
UR2RJ	310
UR2RD1	154
UR2RQJ	115

SWL

UP2-038-453	1050
UA9-1629	850
UA4-09543	704
UC2-00698	182
UR2-08372	100
UA2-125252	18
UA9-165622	16

MULTI-OPERATOR

UK1AAA	1968
UK3AAO	1360
UK6LGA	1230
UK3AAC	182
UK3VAR	50
UA1AGK	18
UK0LAB	7050
UK0FAA	2596
UK0ZAF	2538
UK9OAZ	1394
UK9HAC	658
UK9AOD	540
UK9OAE	350
UK9YAR	132
UK9UAK	44
UA9YAQ	44
UK5JAA	2508
UK5QBE	156
UK7GAA	175
UK2PAF	2147
UK2BAS	1584
UK2GAC	280
UK2GAB	160
UK2GBY	72
UK2GJB	55

SWL

A8890	432
A9016	80
BRS26431	2840
35637	216
35943	4922
EA83455	30
LA-M5606	988
OK3-26558	912
OK115835	396
OK326743	20
SP6-30003	550
JA1-19968	504
JA3-8783	1840
JA5-1231/3	2120
JA9-2023	288
JA9-2155	1649
Manfred Klug	246
Naomi Odagini/8	1067

CW

DM2703/A	484
DM-EA-8031	432
DM-EA-7218	400
DM6721/G	330
DM-6405/N	100
DM-2703/A	96
HA0-31749	300
IS0-57850	234
JA38783	2322
JA4-4665	1400
JA4-31749	1036
JA5-1231/1	918
N ODOGIRI	520
JA3-8943	40
L3042	3935

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

CONTEST CALENDAR

August

14-15 REMEMBRANCE DAY CONTEST
14-15 European CW Contest
21-22 SARTG RTTY Contest
21-22 SEANET WW DX Contest
21-23 New Jersey QSO Party
21-23 QRP ARCI Contest
28-29 All Asian CW Contest
28-29 Arizona QSO Party

September

4-5 Albatross SSTV Contest
11-12 European Phone Contest
18-19 Scandinavian CW
25-26 Scandinavian Phone

October

2-3 VK/ZL/OCEANIA PHONE
9-10 VK/ZL/OCEANIA CW

SARTG RTTY Contest

There are three periods — 0000-0800, 1600-2400 Aug. 21, and 0800-1600 on Aug. 22. All bands 3.5-28 MHz may be used. The same station may be worked on each band for QSO and multiplier credits.

Classification: Single operator. (a) Less than 100 watts input. (b) Over 100 watts input. (c) Multi-operator single transmitter, no power restrictions, and SWLs.

Exchange: QSO no. and signal report.

Points: QSOs with own country, 5 points. With other countries on same continent, 10 points. With other continents, 15 points. US, Canada and Australia call areas count as separate countries in scoring.

Multiplier: Each DXCC country and each W/K, VE/VO and VK call area.

Final Score: Sum of QSO points from all bands times the multiplier from each band.

Awards: Certificates to top scoring station in each country and US, Canada and Australia call areas.

Send logs to SARTG Contest Manager, C. J. Jensen, 0Z2CJ, Meisnersgade 5, 8900 Randers, Denmark, by Sept. 18th.

ORARI SEANET W W DX Contest

Starts 0001 GMT 21st Aug., and finishes at 2359 GMT on 22nd Aug.

All bands 160 to 10 metres, phone or CW may be used, but cross band and cross mode or mixed phone/CW are not permitted.

Classification: Single band-single operator, Multi band-single operator, and Multi band-multi operator.

Contest call on phone is "CQ SEATEST", and on CW is "CQ SEA". Send RS/RST report and a three figure number starting at 001 and increasing by 1 for each successive contact.

Scoring: Contacts within own country will not be counted.

Contacts for contestants outside SEANET area.
160 metres 10 points, or 20 points for YB stations
80/40 5 points or 10 points for YB stations
20/15/10 2 points or 4 points for YB stations

Contacts for contestants of the SEANET area with outside SEANET area.

160 metres	10 points
80/40	5 points
20/15/10	2 points

Contacts for contestants between SEANET area stations

160 metres	6 points
80/40	3 points
20/15/10	1 point

Multipliers: for SEANET and outside SEANET areas, 3 points for each country, and between SEANET stations, 2 points for each country. Final score is the sum of QSO points multiplied by the sum of country multipliers.

Logs and summary sheets: Make out a separate log for each different band. All times must be in GMT. Send logs to SEANET CONTEST COMMITTEE, ISMAIL RAZAK "ESHEE" 9M2FK, 281-C JALAN PEKELILING, BUKIT GLUGOR, PENANG, MALAYSIA. Logs should reach the above address before 30th Oct. 1976. Results will be announced at the 6th SEANET Convention in DJAKARTA in the Republic of Indonesia on 14th November 1976.

Awards: The highest scorer in each country will receive a commemorative certificate of the 6th SEANET Convention 1976.

LIST OF SEANET AREA COUNTRY PREFIXES:

A4, A51, A6, A7, A9, AC3, AP, BV, CR9, DU, EP, HL/HM, HS, JA/JE/JF/JG/JH/JI/JR, JD1, JY, KA, KC6, KG6, KH6, KX6, P29, S21, VK, VQ9, VS5, VS6, VS9K, VS9M/8Q6, VU2, VU (Andaman Nicobar and Laccadive Is.), XU, XV5, XW8, YB, YJ8, ZL, 3D2, 3B6, 3B8, 4S7, 4W1, 5Z4, 9K2, 9M2, 9M6, 9M8, 9N1 and 9V1.

You may have contest results by enclosing one IRC and SAE with your log.

ALBATROSS SSTV CONTEST

1500-2200 GMT Sept. 4 and 0700-1400 GMT Sept. 5

Exchange picture with call sign, signal report and contact number. Score 1 point for contacts on 14 MHz, 5 points on other bands, and 15 points via Oscar. Multiplier, 5 points for each country, 10 points for each continent. W/K and VE call areas are considered as separate in scoring. Final score is total exchange points multiplied by sum of multiplier (counted once only).

Frequencies: 3754, 7040, 14230, 21340, 28670.

Awards: The overall winner will receive a SSTV Converter from Advance Electronics 2nd and 3rd place winners a years subscription to CQTV magazine.

Include a dollar or its equivalent with your entry to cover mailing costs etc. Logs must be received no later than Oct. 2nd by Prof. Franco Fanti, 14LCF, via Dallolio 19, Bologna, Italy.

EUROPEAN DX CONTEST

Contest periods: CW 14-15 Aug., Phone 11-12 Sept., RTTY 13-14 Nov. 0000 GMT on Sat. to 2400 GMT Sun. Single operator stations are only allowed to operate 36 hours of the 48 hours, but there may not be more than three rest periods.

All bands 3.5 to 28 MHz may be used. Entry classifications are single operator — all band, and multi operator — single transmitter.

Contest QSOs can only take place between European and non European stations. Give RS/RST report plus a progressive QSO number starting with 001. Multipliers for non Europeans are determined by the number of European countries worked. Multipliers on 3.5 MHz may be multiplied by 4, 7 MHz by 3, and 14/21/28 MHz by 2.

Final score is the total QSO points plus QTC points multiplied by the sum of multipliers from all bands.

A QTC is a report of an earlier confirmed QSO sent to a European station later. QTCs must contain time, call, and QSO number of the station worked. A QSO can only be reported once and not to the originating station. A maximum of 10 QTCs to a station is allowed. QTCs are worth 1 point each.

Deadlines for logs are CW, Sept. 15th; Phone, Oct. 15th; and RTTY by Dec. 1st. Logs should be sent to WAEDC Committee, Postbox 262, D-895 Kaufbeuren, Germany.

EUROPEAN COUNTRY LIST

C31, CT1, CT2, DL, DM, EA, EA6, E1, F, FC, G, GC Guer, GC Jer, GD, GI, GM, GM Shetland, GW, HA, HB9, HB0, HV, I, IS, IT, JW Bear, JW, JX, LA, LX, LZ, M1, OE, OH, OH0, OJ0, OK, ON, OY, OZ, PA, SM, SP, SV, SV Crete, SV Rhodes, SV Athens, TA1, TF, UA1346, UA2, UB5, UC2, UN1, U05, UP2, UQ2, UR2, UA Franz Josef Land, YO, YU, ZA, ZB2, 3A, 4U1, 9H1.

CONTEST CHAMPIONS TROPHY

As I said last month, I hope to produce a list of stations and points for the Contest Champion Trophy. The list so far only has points from the National Field Day. No multi operator or club stations have been awarded points as the trophy is intended as recognition of individual effort.

Points	Callsign
10	VK2CAX
9	VK4XZ
8	VK3JI
7	VK2AHE
6	VK7HE
5	VK5DL
4	VK1DA
3	VK3TX
2	VK3CM
1	VK2ZCT

The next contest counting for the trophy is the RD Contest and I hope everyone who enters has a most enjoyable time and sends in a log to help their Division. See you in the contest.

1976 BARTG RTTY Contest results: There were 5 entries from VK and are as follows: No. 39 VK5QX, 26638 points, No. 50 VK5RY, 16256 points, No. 53 VK5IF 14274 points, No. 60 VK3KF 10790 points and No. 69 VK5WV on 4774 points.

REMEMBRANCE DAY CONTEST 1976

I would like to see over 1000 logs this year. This would be only about one in seven amateurs in Australia. It is not really a very large number, and I am sure that more than this number are actually on air during the contest.

When you send your log, please think of the Contest Manager and put a front sheet with all relevant details on your log, check for duplications and correct scoring, and send your log early to P.O. Box 67 East Melbourne.

Best of luck to all who enter and may your voices and fists not expire during the contest. ■

AWARDS COLUMN

Brian Austin, VK5CA

See last month's Notes for General Rules for ARI Awards.

CERTIFICATO DEL MEDITERRANEO/SWL (CDM/SWL)

1. The CDM/SWL is issued to those SWLs who can show confirmation of a HRD since 1st January 1960 of 14 countries of the CDM list.
2. The Award is not divided into classes.

HEARD ALL ITALIAN PROVINCES (HAIP)

1. The HAIP is issued to those SWLs who can show confirmation of a HRD since 1st January 1949 of
   (a) a fixed amateur station in at least 40 provinces of the Italian Republic, for Italian SWL.
   (b) a fixed amateur station in at least 30 provinces of the Italian Republic, for foreign SWL.
2. The list of the provinces is the same of the WAIP (see previous notes).
3. The HAIP is divided into four classes:
   (a) Phone — one band
   (b) Phone — two or more bands
   (c) CW — one band (at least 10 HRDs on CW on the same band, the other HRD may be on Phone).
   (d) CW — two or more bands (at least 10 HRDs on CW on two or more bands).

DIPLOMA GUGLIELMO MARCONI (DGM)

This Diploma is to celebrate the experiments carried out by Marconi in various parts of the world and bring them once again to the attention of radio amateurs. The DGM will be awarded to those who have made contact with (or listened to) the localities in which Marconi conducted his experiments. It is issued by the ARI and is free. To obtain the Diploma it is necessary to send to the ARI a log containing all the details of contacts or listenings made, and

(a) 40 QSLs chosen from the localities listed below, or
(b) 35 QSLs chosen from the localities listed below plus the QSL from the official commemorative station 114FGM and one from any other G. Marconi Memorial station (a total of 37 QSLs).

When required (for example:
G = London,
I4 — Bologna,
EA7 = Cadice etc.)
the QSLs must indicate the city or the region of the locality well specified. For the return of the QSLs send the return postal expenses.

The DGM can be obtained in AM, SSB, CW, RTTY, SSTV and mixed. There is no limitation to the band (with respect, obviously, to normal regulations). The Diploma will begin 1st January 1973. The first Diplomas will be awarded on the occasion of the 1974 Marconi Celebrations. The list of Diplomas issued will be published in the official journal of the ARI.

The QSLs must be sent to: ARI — V. Scarlatti 31 — 20124 Milano — Italy.

The locations to be contacted or listened to are the following:

Country/Region or city/Prefix

Capo Verde Isl./——/CR4
Portogallo/Lisbona/CT1
Madeira Isl./——/CT3
Marocco/——/CN8
Spagna/Cadice/EA7
Irlanda/——/EI
Francia/——/F
Corsica/——/FC
Inghilterra/Londra/G
Inghilterra/Flatholm Isl./GB
Inghilterra/Wight Isl./G
Irlanda del Nord/——/GI
Scozia/——/GM
Svizzera/——/HB
Vaticano/——/HV
Italia/Bologna/I4
Italia/——/I5
Italia/Roma/I0
Italia/Fondaz G. Marconi Villa Grifone/II4FGM
Italia/Torre Tigullio Marconi (GE) IP1TTM
Italia/Sicilia/IT9
Italia/Sardegna/ISO
Giappone/——/JA
Argentina/Buenos Aires/LU-A-D
Belgio/——/ON
Brasile/Rio de Janeiro/PY
Svezia/Stoccolma/SM
Svezia/Gotland Isl./SM1
URSS/Leningrado/UA1
Canada/——/VE1
Newfoundland/——/VO1
Labrador/——/VO2
Australia/Sydney/VK2
Bermude/——/VP9
USA/Mass./W1
USA/NY e NJ/W2
USA/Missouri/W0
USA/Illinois/W9
India/——/VU
Gibilterra/——/ZB2
Yugoslavia/——/YU2
Libia/Tripoli/5A
—/Memorial Stations/— ■

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,
Dear Sir,

THOUGHTS ON THE ARNOLD REPORT

Although the Arnold Report as a whole is well thought out and comprehensive it seems to me that sufficient consideration has not been given to the fundamental changes which have taken place in Amateur Radio over the last twenty-five years. The suggested name change and a few sentences in the preliminary recommendations are about the only specific comments which have been made concerning these changes.

It would be good if those who are interested in the future of amateur radio were to look back through some of the magazines of the late 1930s and 40s and realise just how much things have changed. I recall a copy of Wireless World which showed an early mobile rig. The first horse carried the operator who had a microphone mounted on a complicated harness fixed to the collar of the horse.

The second horse carried about a ton of equipment and a mast like a small broadcast tower, and a third horse carried the accessories. In a copy of the RSGB handbook in the 40s detailed instructions were given for drilling holes in the window of an automobile in order to fit an aerial and lead-in for mobile work. And so on.

Right up to the middle of the 1960s it was almost unheard of for anyone to buy commercial VHF equipment. "Appliance operators" were people who used converted wartime surplus.

The point is that in those times, before taxis and every other kind of commercial vehicle were equipped with two way radio, the amateur was about the only person who had these facilities and he had to build the equipment himself. Thus when there was an emergency requiring the use of mobile equipment the amateur was the only person who could supply it. The problem of pirates hardly arose because if one was capable of building the equipment one would normally know enough to pass the examination. For effective overseas communication Morse was an obvious asset if not a necessity.

What is the situation today? There are almost a hundred thousand two way mobile installations in Australia alone, of which the amateurs form only a tiny minority. Every second vehicle has a VHF whip mounted on the roof and even in the remotest country areas there is, if anything, a surplus of two way communication. In this situation the illegal mobile operator can go for his life with practically no chance of being discovered.

The cost of equipment has changed in an equally dramatic manner. On one page of a hobbies magazine way back in 1928 there was an advertisement for a horn type loud speaker, the latest of its type. One could actually tell one announcer's voice from the other. The price of this "hi fi" speaker was ten pounds. This was of course a small fortune in those days. On the opposite page was an advertisement for an eighteen inch hobby lathe complete with chuck and screw cutting facilities. The price of this lathe was — wait for it — eight pounds ten shillings. Try to swap a loudspeaker for a screw cutting lathe nowadays and see how far you get!

The unpalatable fact we have to face is that over the last twenty-five years the amateur, from having a virtual monopoly on radio communication, has become an insignificant drop in a vast sea of every imaginable kind of commercial and private facility. Add to this the fact that commercial equipment is cheaply and readily available to anyone who wants to buy it and we have the situation that the old arguments which justified amateur radio have vanished.

Apart from unusual and exceptional situations the emergency service contribution by amateurs will be very small. The fact that even the most experienced home constructors cannot compete with commercial gear — try to build a smaller and more efficient rig than the KP202 for instance — takes a lot of punch out of the argument that amateur radio contributes anything to development of the state of the art. One justification, namely that amateur radio has an educational influence, is still valid but the neglect by the Institute of the youth radio movement hardly strengthens their argument.

What then is left to justify amateur radio? Simply this. It is a pastime and recreation which is better than many others which receive widespread approval. If it is reasonable for vast areas of precious parkland to be set aside so that people can congregate once a week to yell at a mob of men chasing a dirty bit of leather, or at a mob of horses running round in circles, then there is no further justification needed for allocating air space for the purposes of sport and recreation. This argument would incidentally go down far better with the general public than the current outmoded and academic arguments normally put forward by the Institute.

There is however a complete change of attitude which will sooner or later have to be made by the Institute and its members and that is in regard to the phoney pseudo-professionalism which at the moment influences our activities. If one joins a normal organisation one is not treated as a second class citizen until one has gained some academic qualification. One is accepted and evaluated on the basis of one's practical contribution to the organisation. The quickest way for the Wireless Institute to destroy itself will be to discriminate against the new novice licencees. It is most noticeable incidentally, that the advocates of "professional standards" never advocate such standards

for themselves, such as for instance putting forward the suggestion that existing amateurs should be required to re-pass the examination every five years or lose their licence.

If the Institute was really looking forward it would envisage the possibility of some purely operator "citizen band" licence being issued for recreational purposes and work out how such people could be brought into the organisation.

To sum up . . . Over the last twenty-five years the character and purpose of amateur radio has completely and fundamentally changed and its future justification will be on a sporting and recreational basis. The Institute and its members will have to discard outworn attitudes and encourage a new type of amateur who has been brought up on commercially built equipment. Finally there must be far more attention given to encouraging youth radio groups on both a technical and recreational basis.

Roy Hartkopf VK3AOH. ■

Scout Association of Australia,
Victorian Branch HQ,
384 Elizabeth Street,
Melbourne, 3000, Vic.
The Editor,
Dear Sir,

Word has reached me that there are radio amateurs who in the past would have been quite keen to participate in that event which unites amateur radio and scouting for one weekend annually, i.e. Jamboree on the Air (JOTA), but have not done so because they were not approached by a scout group and asked for assistance.

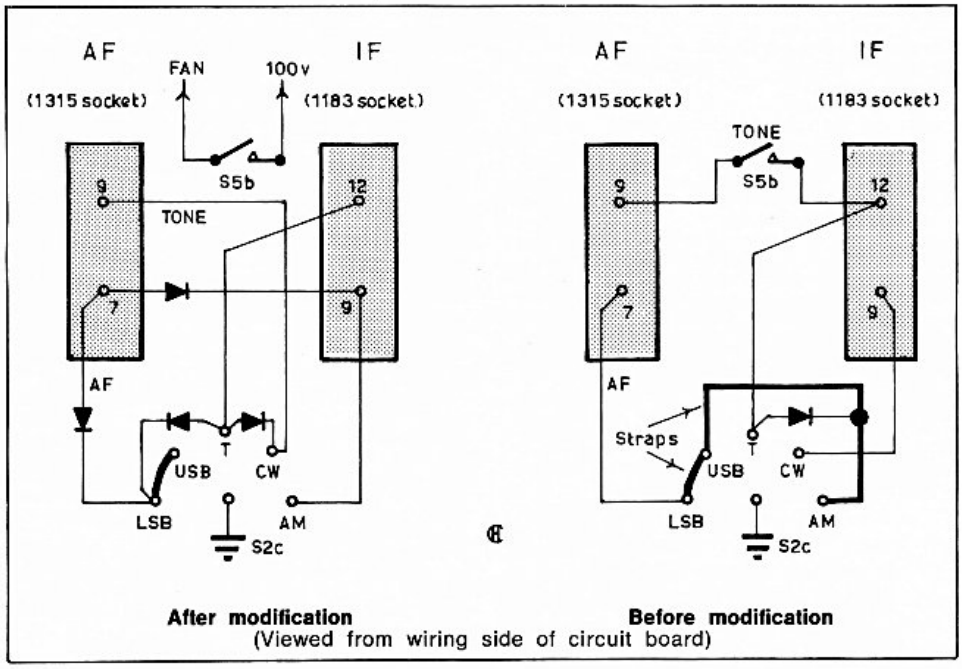
If this is so, in my capacity as the Scout Association's Victorian Branch Co-ordinator for JOTA, I would like to rectify the situation by making available my name and address and asking that these be published in "Amateur Radio". If interested amateurs would please drop me a line or leave a message at Branch HQ, I will be only too pleased to put them in touch with a scout group in their vicinity.

Yours sincerely,
Paul Thomas. ■

The Editor,
Dear Sir,

Since the publication of my letter about modifications to the FT 101B AR Dec. 1975, I have had some inquiries as to details of the rewiring to use an AM filter type XF30B as used in the FR101 receiver. Below is shown a semi pictorial sketch showing the circuit as is, and as modified. It is necessary to add two additional blocking diodes and these can be any silicon switching type diodes, preferably with a low capacitance. While doing the modification it is a good idea also to disconnect S5b and use it to operate the fan as shown so that the fan is not running continuously on receive. It is however essential to make two modifications to the AF board PB 1315. The 470 ohm resistor, R 17 from pin 6 of the IC, Q4, must be removed from the line to pin 7 on the socket and put to ground. This will eliminate the vox jitter which occurs on the CW mode. Because of the modifications the line to pin 7 on the socket, which will still have the emitters of mic amp transistors Q2 and Q3 connected to it, will be raised by about 0.7 volt. This affects the bias on the mic amp transistors and the base resistor R6 should be altered from 3.3k to 5.6k otherwise there will not be enough mic gain. The modifications to the mode switch S2c and to the socket connections of the IF and AF boards should be clear from the sketch. Be careful to locate the correct tags on the mode switch. It is easy to pick the wrong one! Make sure the diodes are the correct way round! The XF30B filter is installed in the CW filter position exactly as shown in the instructions for the CW filter XF30C.

Roy Hartkopf VK3AOH. ■



After modification **Before modification**
(Viewed from wiring side of circuit board)

PROJECT AUSTRALIS

David Hull, VK3ZDH

Report on Oscar 6, 7 and 8 "operations" meeting, Washington, DC, May 76, WIA Rep.: VK3ZDH.

This meeting attended by representatives of most of the major amateur satellite organisations, was concerned mainly with command and operational problems of Oscars 6 and 7 and forward planning for Oscar 8.

The meeting was chaired by Rich Zwieko K1HTV Amsat VP operations, who is responsible also for worldwide command station co-ordination. Each command station was reviewed in terms of automation status, coverage, command effectiveness etc., and major problems were discussed in round table conferences.

It became very apparent that the general policy of using individually owned and operated command stations, is much more efficient long term than the alternative policy, adopted in some countries, of group operated stations situated in universities and such. Group stations have in the past suffered somewhat from conflicts of interests, and whilst they were generally better financed, tended to swallow up such financing in buildings etc. and not produce in terms of command effectiveness. Remote locations also suffered from lack of instant access in times of emergency. On the other end of the scale, countries where the command situation is virtually a one man band (such as ZL), tended to be spasmodic in operation and difficult to service effectively. Command station problems directly affect the operation of the satellites (particularly Oscar 6) over the geographic region of the station concerned, and this can lead to unrest and ill feeling between regions.

Problems of this nature lead directly to the poor operation of Oscar 6 over Europe in its first 18 months.

Also apparent at the meeting was the reduction in command effectiveness of the Northern hemisphere, compared to the Southern hemisphere. This is a direct result of trying to command with Amateur power levels through the QRM and QRN produced by the USA-Europe-Japan "megalopolis". Unfortunately the greater area of the earth's surface seen by Oscar 8 will only increase this problem, however the greater reliance of 8 on internal computer control and the increased sophistication of the command link should overcome this.

The meeting then went on to review some of the major experiments conducted on Oscars 6 and 7. These included:—

(a) Emergency locating transmitter tests: This is perhaps one of the most significant tests conducted on the amateur bands for some years. Amsat was approached early last year by Dr. Daniel Brandel of NASA who proposed to use the satellites for a ranging experiment using the type of transmitter normally carried by civil aviation aircraft for emergency location purposes.

Similar power and antennas to the EL7 transmitters were used, but on the Oscar frequencies. The experiment proved a great success, even with somewhat primitive ranging apparatus, resolutions of better than 3 km were obtained. An accuracy of this nature would allow search authorities to quickly locate a downed plane in the Australian outback or the Canadian northwest. The results have helped Dr. Brandel in his feasibility study for NASA in a way that no other service could have provided.

(b) Medical Experiments: Bill Hook W3QBC outlined the transmission of EKG and EEG waveforms from point to point in the USA and explained the service these could provide for treatment of heart (for example) patients in remote and emergency conditions. The experiments which were most successful used the technique devised by David Nelson K7RGE at the University of Arizona Hospital.

(c) ASCII code transmission and Remote minicomputer accessing: These experiments conducted between Randy Smith VE3SAT and Dick Allen W5SXD proved the feasibility of program and data

SEPTEMBER PREDICTIONS

	OSCAR 6				OSCAR 7			
	Orbit	Time	Long					
Date	No.	Z	°W		Date	No.	Time	°W
1	17736	00.52	70.00		1	8210	00.38	59.39
2	17749	01.47	83.75		2	8223	01.32	73.01
3	17761	00.47	68.75		3	8235	00.31	57.89
4	17774	01.42	82.50		4	8248	01.26	71.51
5	17786	00.42	67.50		5	8260	00.25	56.39
6	17799	01.37	81.25		6	8273	01.19	70.01
7	17811	00.37	66.25		7	8285	00.18	54.89
8	17824	01.31	80.00		8	8298	01.13	68.51
9	17836	00.31	65.00		9	8310	00.12	53.39
10	17849	01.26	78.75		10	8323	01.06	67.01
11	17861	00.26	63.75		11	8335	00.06	51.89
12	17874	01.21	77.50		12	8348	01.00	65.51
13	17886	00.21	62.50		13	8361	01.54	79.13
14	17899	01.16	76.25		14	8373	00.54	64.01
15	17911	00.16	61.25		15	8386	01.48	77.63
16	17924	01.11	75.00		16	8398	00.47	62.51
17	17936	00.11	60.00		17	8411	01.41	76.13
18	17949	01.06	73.75		18	8423	00.41	61.01
19	17961	00.06	58.75		19	8436	01.35	74.63
20	17974	01.01	72.50		20	8448	00.34	59.51
21	17986	00.01	57.50		21	8461	01.29	73.13
22	17999	00.55	71.25		22	8473	00.28	58.01
23	18012	01.50	85.00		23	8486	01.22	71.63
24	18024	00.50	70.00		24	8498	00.22	56.51
25	18037	01.45	83.75		25	8511	01.16	70.13
26	18049	00.45	68.75		26	8523	00.15	55.01
27	18062	01.40	82.50		27	8536	01.09	68.63
28	18074	00.40	67.50		28	8548	00.09	53.51
29	18087	01.35	81.25		29	8516	01.03	67.13
30	18099	00.35	66.25		30	8573	00.02	52.01

swapping between similar units via the satellites. As this is a fundamental plank in the anticipated command operation of Oscar 8, the success of this experiment has great importance for Amsat and associates.

(d) Other experiments reviewed included a mass broadcasting (to private homes) experiment conducted by the Hungarians under Prof. Geschwindt of the University of Budapest, Mobile in motion experiments by W2GN/M and the host of school educational experiments conducted under the ARRL Satellite Education program.

Most of the second day of the meeting was taken up in forward planning for Oscar 8. This is one satellite that due to its coverage will require an immediate operational "band plan" from switch on. Discussions centred around the best method of implementing this through publicity etc. Command station location was again discussed and it was decided that the basic "Oscar 7" set up (VE and VK) with the addition of W and DL would be most suitable. ■

INTRUDER WATCH

Alf Chandler, VK3LC
1536 High Street, Glen Iris, 3146

Since its inception in Australia in 1967 the Intruder Watch has slowly taken shape until it is a viable and integral part of Amateur Radio. The idea put forward at the WIA inaugural meeting was that — **"it is an attempt to preserve the few remaining frequencies available to the Amateur Radio Service"**, and it was said that — **"there is a pressing need to remove intruders from Amateur frequencies because the frequencies are becoming crowded to the stage where Amateurs find difficulty in finding a clear spot to operate"**, and went on to say — **"Generally speaking anyone may use any frequency until someone objects. This means that intruders who use amateur frequencies illegally may claim that they have the right to the frequencies because no one has objected"**, and — **"this is vital at the International level. Unless Amateurs can prove that they have objected to intruders using their bands, they have no case before an International Tribunal. It is thus important that we have a record of intruders and the action we have taken to object to them"**. This conception is still valid, and the Intruder Watch has been organised on a Divisional basis with the Federal Co-ordinator resident in Melbourne. His responsibility is to co-ordinate all reports forwarded through the Divisional Co-ordinators, so that they reach the Postal and Telecommunications Administration regularly for filing, or for action whichever is applicable. Another aspect of his responsibility is the compilation of monthly summaries for inclusion in the World IARU Monitoring Service monthly summary.

Divisional Co-ordinators are responsible in their respective Divisions for collecting reports from Observers, and forwarding them on a monthly basis to the Federal Co-ordinator. They are also responsible for disseminating news and know-how to their Observers, and for recruiting Observers.

As well as the above the Federal Co-ordinator has taken upon himself the task of educating members in the identification of intruder signals heard in the Amateur bands. With such in mind a tape recording has been produced wherein all modes of signals are reproduced. A copy of this tape is available to any member who is interested enough in the Intruder Watch to request such. However, to defray costs we do ask members to supply their own reel or cassette. For reel recorders dubbing can be done at 1 7/8, 3¾ or 7½ IPS, but the reel supplied must be able to run for forty minutes. A C90 is required for cassette recorders.

Recently, with the restructuring of the PMG's Department, the Licensing Policy and Operations Branch has been alerted to offer a much better liaison than in the past with the WIA in the Intruder Watch field, and our Co-ordinator is enjoying much more co-operation. This is exemplified in their request to re-design our report forms so as to comply with their filing arrangements. This has been done, and the new forms will be in the hands of our Co-ordinators and possibly distributed by the time this is published in our Magazine.

The new forms, a copy of which was reproduced in May AR are to be used only for stations or signals that can be identified. When I say "identified" I mean a call sign must have been copied for A1 (CW) or F1 RTTY, and a verbal identification heard from A3 (AM broadcasting). Our Administration is only interested in signals that can be Identified, and it is encumbent upon us to supply them with identifications so that they can alert their monitoring stations to listen for them. They are much too busy with other services, and their requests to be able to **look** for intruders in the Amateur bands. Don't think that the Amateur Service is the only one that suffers from intruder intrusions. I am told that all services, and including emergency frequencies are subject to interference from time to time. However, priority is given to essential services.

With the above in mind a drive has been instituted to recruit more Observers. From our Administration's point of view it is essential that we have more Observers because, quoting their own words — **"Unless we get many reports of a particular intruder, its frequency, identification and traffic passed it lacks credibility, and we cannot alert our monitoring stations to listen to it, nor file a complaint to any other Administration. We must be positively sure that the intruder really IS an intruder and sure from which country it eminates. There must be no slip-ups otherwise we are in strife from our Government"**.

Another aspect of the Intruder Watch that members may have overlooked is the necessity to supply our delegate to the WARC Conference being held in Geneva in 1979 documentary evidence of regular and persistent intruders heard in our bands over the years. By scrutinising past reports several patterns have emerged which will serve to emphasise the importance of observations.

At the Hong Kong Conference of Region 3 Amateur Radio Associations, it was resolved to come into line with Region 1 in forming what is known as the IARU Monitoring Service. This is now in operation with headquarters resting with the WIA. However, so far there has been little evidence of any Intruder Watch organisations in any other country in Region 3 except Australia, so we have to take the whole burden of observations.

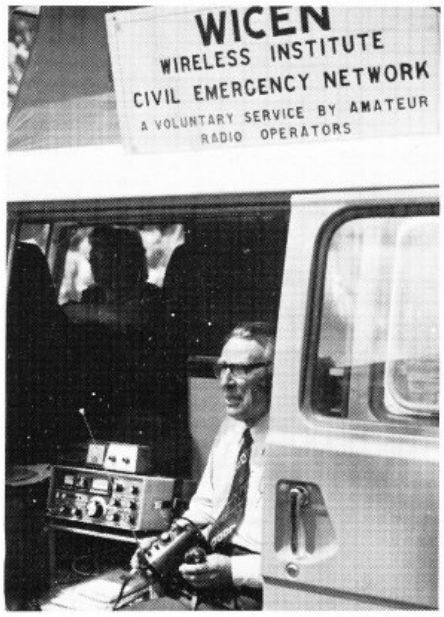
Thus it behoves the Australian Amateur to upho'd his tradition of help and alertness in tracking down and reporting intruders and I am hopeful of an even more vigorous Intruder Watch in the near future.

Note — State Co-ordinators are as follows —
VK1AOP, Ted Pearce, 45 Carnegie Crescent, Narrabundah, 2604.
VK2AFG, Les Weldon, 11 Raymond Avenue, Northmead, 2152.
VK3XB, Ivor Stafford, 16 Byron Street, Box Hill South, 3128.
VK4KX, Murray McGregor, 6 Murray Street, Red Hill, 4059.
VK5LG, Leith Cotton, 64 Weroona Avenue, Parkholme, 5043.
VK6, Albert Cash, 54 Frederick Street, Shoalwater Bay, 6169.
VK7MX, Max Ives, P.O. Box 12, Devonport East, 7310. ■

WICEN ACTIVITY

A major WICEN activity was held last January in Elder Park (just north of the Adelaide "Square Mile") in assisting the Good Neighbour Council with communications at the Australia Day Fair. A total of 21 operators manned VK5WI/P and other portable units around the area on 146.5 MHz on this occasion.

For the first time in South Australia, WICEN was able to demonstrate the full potential of amateur radio as a message handling media through the handling of



Gordon Bowen VK5CXU

the third party traffic. This activity was approved by the Regulatory and Licensing Branch for which we are thankful of their co-operation.

WICEN was able to demonstrate to the public how amateur radio provides excellent communications. A candid photo shows Gordon Bowen VK5CXU relishing a quiet moment at one of the portable locations.

I would like to take this opportunity to personally thank all members who ably assisted in this excellent public relations exercise.

Alan Raftery, VK5BW,
VK5/8 Senior WICEN
Co-ordinator

LARA

Ladies Amateur Radio Association

"FOXHUNTING"
OR "WHICH TREE DID WE LOSE THE BEAM OH MA?"

LARAs first year has been remarkable for many things but perhaps our best known activity as a group, in VK3 especially is foxhunting — or as purists prefer — "vixen-hunting".

Several of LARAs founder members in VK3 are also keen foxhunters, so one of the first get-together activities suggested was a foxhunt — with a difference (or two).

As a pleasant change from belting around the countryside at dead of night (as in VHF group Friday night foxhunts) we in LARA belt around the countryside on Sunday afternoons instead, when we can at least see where we're going even if we don't recognise it! We have a barbecue as well, with or without the traditional chocolate cake, and, most important of all — each team of "hounds" must include at least one lady hound or "YL".

The first foxhunt we had was in fact, unofficially "won" by two gentlemen, but as they were unable to decide which of them should be the YL for the occasion, they were penalised 40 points and retired, muttering into their respective beards. The fox (or vixen) on this inaugural hunt was Irene Robinson with her OM Jeff VK3YER, and young YL Kirsty, who at 4 is LARAs youngest member so far. No casualties were reported and all hounds arrived for the barbecue with the VK3 President

Norma VK3AYL and hounds

of LARA trailing the field by about ½ hour — we wonder why.

Since this first hunt there have been several happy days in the field — occasionally in the field right up to the axles, unfortunately — and several YL hounds have been introduced to amateur radio in this way. Winners are not always the experienced YL operators and one winner had never seen a transmitter before her starring debut.

We recommend this sport as it is always fun and occasionally hilarious. Sometimes the fox is hidden in infuriating places but hounds are not allowed to bend the beam over the head of the running fox who will say "But it's obvious where you hid it — isn't it!" — it's just not ladylike!

No specialised knowledge is needed, but an acquaintance with freeway overpasses, one-way streets, inaccessible cul-de-sacs and hidey holes all over the city comes in handy. A street directory is also helpful to those wondering where the whatever they have got to now. "This is the fox. We have been found for 2½ hours now and if you are still in Bourke Street you are in the wrong place" — and so on.

Due to an unfortunate misunderstanding in last month's timetabling, no LARA notes reached AR and all eager readers missed the news that LARA is now one year old — happy birthday, "ra ra" and all that. July 30th was selected as the birthday party day in VK3 and appropriate celebrations are planned for this happy occasion.

To celebrate achievements by members during the year we firstly salute Iren Robinson whose work as treasurer of the VK3 division of the Institute has been appreciated by most of the VK3 members in general, as well as those in LARA who wish Irene continuing success, especially in the August exam.

Secondly to Mavis Russell, congratulations on passing telegraphy at the February exams.

At the time of going to press we do not know of other YLs successful in exams so far this year (some haven't even heard results yet!) but congratulations to those successful already and best of luck to all those sitting for the exam this month. ■

AFTER THOUGHTS

MODIFICATIONS TO A 2M SOLID STATE TRANSVERTER

Peter Williamson VK4ZWP
3 Rabaul St., Soldiers Hill, Mt. Isa, 4825

Since the original article was prepared, the availability of specialised test equipment, including a Spectrum Analyser, some minor modifications have been made to the unit, and test figures taken.

(1) **MODIFICATION**
Add a 130 MHz trap to the base of the power amp Stage Q5. The new coil is designated L15.

L15. 5T 20 SWG TCW 5/16" I.D. 1 DIA spacing between turns.

(2) **ALIGNMENT**
Tune 20 pF trimmer for minimum 130 MHz output — note most amateurs' test equipment will not be sensitive, or selective enough to find the precise dip. Therefore an alternative alignment is as follows — tune transverter as per previous instruction, then with single tone input adjust 20 pF trimmer for minimum output at 144 MHz. Then *increase* capacity until output power *just* returns to normal. This procedure is not optimum but will be approximately 3 dB down on it.

(3) **TEST FIGURES** — Spurious Emissions Test equipment SYSTRON DONNER DC — 10 GHz Spectrum Analyser HP DC-500

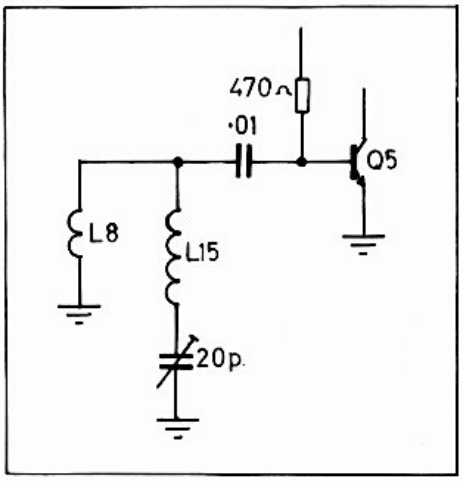


Figure 1 — 130 MHz trap

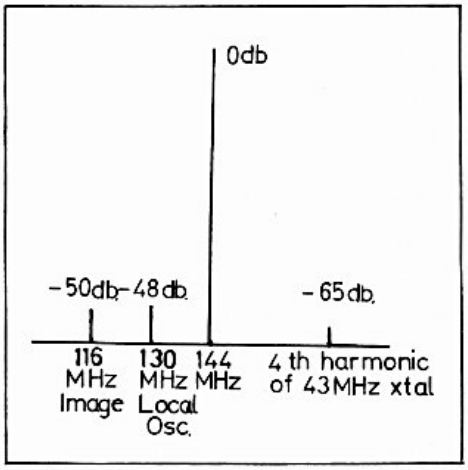


Figure 2

MHz ATTENUATOR — Single 1 kHz tone input to exciter (Home Brew 14 MHz).

(4) Since writing, the transverter has been fed into a power amplifier consisting of a QQE03/10 and a QQV06/40 providing 80 W RMS OUT SINGLE TONE for Oscar 6 & 7 work. The circuit used is the same as in the previous TUBE type 2 M transverter published in AR.

Plugging in a suitable XTAL was all that was required, re-tuning only providing a 1.5 dB increase in output. Spurious emissions with the linear were better than the measuring capability of the analyser (7-70 dB). ■

A STRANGE CIRCUIT

invented by G. Miles VK2KI ....

Occasionally a circuit is constructed that works well but according to theory it shouldn't work at all. Gil, VK2KI, has built such a circuit. Here is the story; perhaps you can offer an explanation.

In February 1975 the technical editors received the first of several letters from Gil describing a noise reduction circuit. Gil *wrote Because my location is surrounded by home units and I am unable to erect an antenna well up in the clear, I am subject to very severe noise particularly the continuous background type. Over the years blankers and silencers of the IF and AF variety have been tried but none so effective, simple and easy as this circuit.*

The circuit consists of only two items, a 100 pF variable capacitor and a coil of 16 turns of 18 gauge enamel on a one inch diameter former. These components are wired in series and enclosed in a metal box. The capacitor is grounded at one end and the top end of the coil is connected via coaxial cable to the receive contact of the aerial change-over relay of Gil's FT200. The circuit tunes to both 7 and 14 MHz (presumably series resonance).

Gil explains that the noise usually runs at a steady S3 to S4 and most signals are around S4 to S5. In use the circuit is tuned until the noise level dips. Says Gil "it would seem that such a circuit would indeed "suck out" both signal and noise. Not so! Certainly the signal drops but the noise seems to go down faster than the signal and I am quite happy to listen to S2 or S3 signals on headphones if the noise disappears."

Of course in theory a series tuned circuit should attenuate both signal and noise by equal amounts eventually resulting in a degradation of the signal to noise ratio as the the signals get weaker and thus the receiver's internal noise becomes more prominent. So does the circuit work and if so how?

Gil reports that Ray, VK3RS, Des, VK3ADH and VK3AM have built similar circuits and achieved the same results. Also Bob, VK3ML, and Snow, VK3MR, have been treated to a demonstration by Gil and both agreed that it works effectively. So apparently it works, but why?

Overload by noise, local signals or some effect related to intermodulation or misalignment of the FT200's have been proposed as possible reasons why the circuit works. None of the associated explanations are very convincing. Therefore this article has been published to see if any reader can propose a convincing explanation. Over to you.

de VK3AFW

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AN 80 METRE NOVICE RECEIVER — PART 4 — THE AUDIO AMPLIFIER AND POWER SUPPLY

The audio ampjlifier is probably the easiest section of the receiver to understand as each stage has only one function to perform. The audio amplifiers are linear amplifiers operating in class A.

DC VOLTAGES

The audio amplifier includes all components from C68 to C76, R63 to R77, V6 and T10. The two valve sections of V6 each receive bias due to the voltage drop across their respective cathode resistors R67 and R73. Initially each valve has no negative bias applied to its grid to control its conduction. As soon as each valve section commences conduction, a voltage drop occurs across each cathode resistor. The voltage at pin 8 and pin 7 will go positive as the plate supply to both valve sections is positive. Pin 9 and pin 2 are both at DC earth through high value resistors, although for clarity, they can be considered as being wired straight to chassis for the purpose of this explanation. With pins 9 and 2 at earth potential and pins 8 and 7 several volts positive with respect to earth, it will be seen that pins 9 and 2 are, in fact, negative with respect to pins 8 and 7. If pin 8 is 5 volts positive, this means that pin 9 is at earth potential which is 5 volts in a negative direction from the cathode. The values of R67 and R73 are such that the valve sections stabilise at a particular value of cathode current which corresponds to a suitable bias to obtain linear operation.

AC OPERATION

Having established the DC operating points of the valves, we move on to the AC operation or audio amplification of the two sections. The voltage at the plate of V5 will vary at an audio rate depending on the input RF signal and the setting of R59. Take it as read that this does in fact occur — last month's issue should have made this clear. This variation in voltage at the plate anode of V5 which is a combination of DC and superimposed AC is applied to one plate of C68. Under static (no signal) conditions the voltage on the plate of V5 will be between 25 and 130 volts positive (see table), and one plate of C68 is connected to this potential. The other plate is connected to earth via R64 and is, therefore, at zero potential. Suppose V5 plate is at 100 volts positive, then C68 is charged to this same potential. Consider that the influence of the AC component on the plate of V5 is to lower the plate/C68 voltage to 50 volts instantaneously. The capacitor C68 is charged to 100 volts and it cannot discharge instantly as it must discharge through R64 at 0.47 Megohm resistor. The plate of C68 connected by R65 to the grid of V6A is therefore driven negative with respect to earth to the value of negative 50 volts. The capacitor still has 100 volts dropped across it, but the audio component has been coupled across it from the plate circuit of V5 to the grid circuit of V6A. The audio signal applied to the grid of V6A causes the bias to vary at an audio rate, which from previous discussion you will remember causes an amplified version of the audio signal to be developed in the plate circuit. V6A and V6B are coupled together in the same way as V5 and V6A are coupled and the operation is the same with the exception that the audio signal is increased by about 15 times in voltage.

C68, C69, R64 and R65 form an elementary bandpass filter designed to pass the voice communications frequencies of 300 to 3,000 Hz with little attenuation, and to attenuate all other frequencies as much as is possible. The network in the grid circuit of V6B does exactly the same thing. The cathode bypass capacitors in both sections of V6 are relatively low value so that their bypassing effectiveness is minimal below approximately 300 Hz, in this case forming an elementary high pass filter, in other words passing all frequencies above 300 Hz. The values of the capacitors and resistors in these networks are determined by the impedances of the circuits into which they work, the frequencies that are required to be passed and the shape factor of the filter. It is not intended to go into the design criteria of filters in this article, and they may form the basis of some future article.

AUDIO OUTPUT

The output from V6B is coupled via a speaker transformer to a small loudspeaker. By examining the table showing the voltage to be expected at each valve element, it will be seen that only 10 volts is dropped across the speaker transformer. However, when the voltage on the grid of V6B is fluctuating at an audio rate, the current drawn in the plate circuit will also endeavour to vary. The speaker transformer T10 has an appreciable amount of inductance and acts like a choke. You will recall from elementary notes that one of the characteristics of chokes is to oppose any change to the value of current flowing through it. Therefore, if the current drawn by the valve is reduced, the choke endeavours to get it to draw more by increasing the voltage to the valve plate. The converse is also true — if the valve endeavours to draw more current, the choke opposes this and the voltage applied to the valve is reduced. The transformer will, therefore, have an apparent resistance or more correctly, an impedance to the flow of AC/audio which is much higher than the measured ohmic resistance of the primary winding. The valve, therefore, has a high impedance AC/audio load but a low resistance DC supply.

The speaker transformer used in this receiver has a 14,000 ohm primary impedance to a 3.5 ohm secondary impedance. Just as a tractor, road grader, etc., needs large reduction gearing between the high speed engine and the road wheels, so does the valve which is a high impedance device need the equivalent of gearing to match the low impedance of the speaker. A value of 14,000 ohms for the primary may not be optimum as there are no data sheets to the author's knowledge on the 6BL8 used as an audio amplifier. A 10,000 ohm to 3.5 ohm transformer should also be quite satisfactory. The impedance ratio of the transformer used, T10, is obtained by dividing 14,000 by 3.5 which equals 4,000 : 1. This is the impedance transformation ratio. The turns ratio of this transformer is obtained by getting the square root of 4,000 which equals approximately 63 : 1. This means that 63 volts applied across the primary will appear as 1 volt across the secondary, but the current will be 63 times as great — if the transformer were 100 per cent. efficient, which it is not. It is easier to obtain a 7 or 5K ohm speaker transformer with a 3.5 ohm secondary. Speakers with 3.5 ohm impedance are not always easy to obtain, but 8 ohm speakers are readily available. Now, if an 8 ohm speaker is used on the 3.5 ohm winding, the transformation of its impedance back into the primary will be 8/3.5 x 7K ohms = 16000 ohms, or 8/3.5 x 5K ohms = 11400 ohms. You can, therefore, use a valve type speaker transformer other than 14K/3.5 ohm if you are prepared to do a little calculation of impedance transformation radios.

The output from the speaker transformer is fed to a stereo type phone jack with a set of changeover contacts as per the circuit diagram in May issue. The audio can go direct to the internal speaker or can be fed to an external speaker, or can feed a pair of headphones wired to the ring and sleeve of a stereo plug. R76 is adjusted in value until the volume is at a satisfactory level for the operator. R77 serves a similar purpose for monitoring the modulator output. This is now redundant as off air monitoring is achieved via the receiver in a desensitised mode.

The receiver is used to monitor the transmitter by keeping almost all of it operating even when the transmitter is operating, only the hexode section of V4 being switched off. With the hexode inoperative the sensitivity of the receiver is quiet low and consequently it is not overloaded by the transmitter on the same chassis. However, it is still necessary to contro lthe actual level of the monitored signal fed to the speaker and to our ears. R70, R71 and R72 control the level of the monitored signal applied to the grid of V6B. R71 and R72 have no effect on the signal when on receive, as they are floating above earth. When the transmitter is brought into operation pin 5 of STR2 is earthed via a relay contact within the transmitter section. It is important that the position of R27 be altered to that in the diagram in May issue, otherwise RF will be fed into the grid of V6B and cause distortion. R27 which is only 100 ohms

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Also shown in the photograph is the YO-100 monitorscope, FT-101E transceiver, YC-601 digital readout adapter and YP-150 dummy load-power meter.

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Insertion Loss	< 3 dB	< 3.5 dB	< 3.5 dB	< 3.5 dB	< 3.0 dB	< 5 dB	< 6.5 dB
Input-Output Z_t	500 Ω	500 Ω	500 Ω	500 Ω	1200 Ω	500 Ω	500 Ω
Termination C_t	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF	30 pF
Shape Factor	(6:50 dB) 1.7	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.2	(6:60 dB) 1.8 (6:80 dB) 2.3	(6:40 dB) 2.5 (6:60 dB) 4.4	(6:60 dB) 2.2 (6:80 dB) 4.0
Ultimate Attenuation	> 45 dB	> 100 dB	> 100 dB	> 100 dB	> 90 dB	> 90 dB	> 90 dB
Price	$31.95	$45.45	$48.95	$48.95	$48.95	$34.25	$63.95

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places the relay contact and the line to the grid of V6B that many ohms above RF earth. It must be remembered that some of the relay contacts have quite a high level of RF on them and that they are close to this monitor audio line. It is also important that the line to R72 be shielded to overcome any additional chance of RF getting into the grid of V6B.

SUMMARY

The transmitter and receiver work well both independently and together. The transmitter puts out about 8 watts on AM and 10 watts on CW, it features press to talk for AM operation and semi-breakin operation on CW. It has full monitoring facilities for the transmitted signal, the monitor being an off air type — the best type. It is possible to monitor the AM signal to check quality, bandwidth and for spurious signals within about 100 kHz. The CW signal is monitored for key clicks, bandwidth and used as a keying monitor. The receiver is sensitive, stable, reasonably selective, does not drift excessively, is able to handle both weak and strong signals without stress, and is easy to operate. All in all, the unit works well and should for you too.

In some circumstances C65 may need to be varied in size, perhaps down to 0.027uF, to get good regeneration. It has been observed that some 6BX6 valves are microphonic, so try several obtained from old TV sets or new ones and use the best one.

PRECAUTIONS

As has been stressed before, the layout of components is extremely important. This transceiver is no more tolerant of gross layout errors than any other piece of electronic equipment. If you are inexperienced at construction practices, it is suggested that you make the receiver (if built separately to the transmitter), on a chassis about 20cm by 28cm to allow ample room in which to work. Spread the work out, keeping each section of the receiver to itself and on no account intermingle succeeding sections unless you know exactly what you are doing. *Keep earth leads short* — earthing is every bit as important on 80 metres as it is on VHF. *Keep inputs away from outputs* or you could easily have trouble with oscillation, erratic operation, poor sensitivity, distortion, etc.

It is most strongly advised that you read March and April 1974 Newcomers Notebook for information on equipment layout — it could save you much heartache and frustration with this project or any other project that you may care to undertake.

If possible, *obtain all parts before you start building* so that you can physically lay them out to see how everything will fit. It is not much good allowing an area 5 cm square for a component only to find that you require an area 7 cm square to accommodate it. It is equally important that this component be placed in its correct position and not wired in later from a spot remote from the particular circuit of which it forms an integral part. Good luck and good operating.

RECEIVER ELECTRODE VOLTAGE TABLE — Measured to earth — Chassis

Valve Type	12AH8	6BX6	6BL8-T	6BL8-P
Cathode	3.5-30v*	Ov	5v	3v
Grid	Ov	Ov	Ov	Ov
Screen	90-120v*	0-50v†	—	200v
Plate	210-250v*	25-130v†	—	240v
Triode Plate	100v		90v	—

*Varies with setting of RF gain. †Varies with setting of regeneration control.

COSTS

Most newcomers will probably have access to old valve type radios and TV sets and the availability of items from these sources has been carefully considered in the design of this transceiver. The stripping down of a couple of old sets would, in most cases, provide the more expensive components such as tuning capacitors, transformers (power speaker, I.F.), and possibly some of the valves, free of cost. Many of the smaller items such as knobs, sockets, resistors, fixed capacitors, etc., would also be re-usable. Do not re-use paper capacitors as they are invariably leaky.

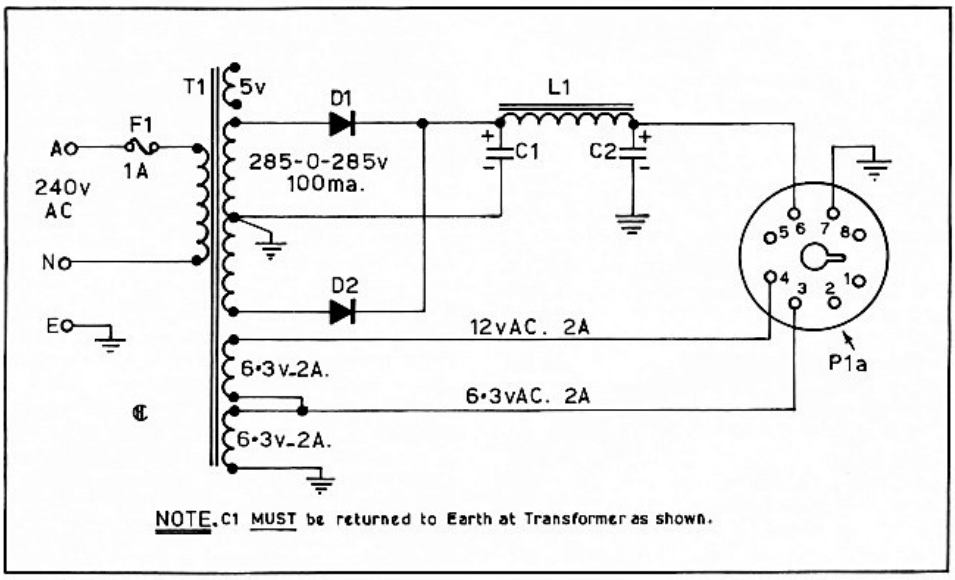

Figure 1 — Power supply for novice transceiver

On this basis, and depending on one's willingness to *"make the most of things"*, it is estimated that the complete rig could be built for between $20 and $60 which is a fraction of the cost of even the cheapest commercially available transceiver modified for novice use.

The receiver covers the whole of the 80 metre amateur band (not just the novice segment) on CW/AM/SSB, and subject to crystal availability, the transmitter will cover the same range on CW and AM.

The unit, therefore, has a much wider application than its name might suggest. Being moderate in both size and weight, it could be a useful *"second string"* for portable operation even after obtaining a full call.

POWER SUPPLIES

A number of people have asked about a power supply for the Novice Transceiver. The supply shown in figure 1 is the one used with a prototype transceiver. The operation of a power supply will not be described here as this is covered quite adequately in the various amateur handbooks available from our advertisers or from *Magpubs*. The output voltage of the power supply varies with the amount of current drawn from it, which explains why the voltage to the receiver is 360 volts but only about 310 volts on AM transmit. It is important that C1 is earthed to the same spot as the centre tap of the high tension winding, otherwise earth loops can be created throughout the chassis, which could cause unnecessary hum in the receiver.

It might be pointed out that this is only one of many variations of power supplies that can be used to power the transceiver. Voltage doubler type power supplies, bridge rectifier systems and so on can be used equally as well as the unit described.

Some newcomers have asked how they could operate the heater system off 6.3 volts AC. This is simple, wire all valves

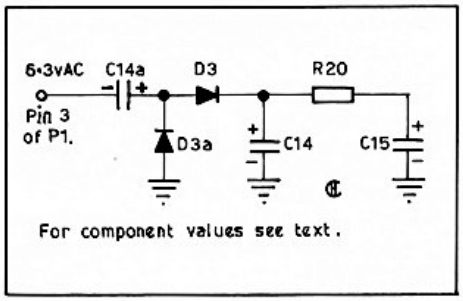

Figure 2

with one end of their heaters to earth and the other end to a 6.3 vac line run around the chassis to each unearthed heater pin. Observe the slight difference in wiring with the 12AH8 if used. The relay supply still needs to be run from 12 volts DC so a voltage doubler needs to be wired to the heater line as shown in figure 2. The component values are as per the list in September 1975 issue of Newcomers Notebook. C14A and D3A are the same as C14 and D3.

POWER SUPPLY COMPONENT LIST

F1 = 1 amp fuse with fuseholder.

T1 = Old valve type power transformer. 240 volt primary, 285-0-285 volt centre tapped secondary at 100ma, 5 volt 2 amp winding (unused), 2-6.3 volt 2 amp winding wired in series aiding to give 12.6 volts at 2 amps.

D1 = EM410 silicon power diode. 1000 volt 1 amp diode. Must have a peak inverse voltage rating of at least 3 x 285 volts = 855 volts. Rating of diode is therefore adequate.

D2 = EM410. As for D1.

C1 = 16uF 450 volt working electrolytic capacitor.

C2 = 16uF 450 volt working electrolytic capacitor.

L1 = 3 to 10 henry 100 ma choke. Old TV type choke ideal, as they have low winding resistance. If the inductance is lower than 3 henries, the capacitors C1 and C2 can be increased in value, up to about 50uF.

P1a = Octal socket wired so that transceiver can plug into the power supply.

R1 & R2 = 2 100k ohm 1 watt resistors wired in series across C2. They are not shown on the circuit diagram. These are used as bleeders to discharge the power supply capacitors when no load is applied to the power supply. The capacitors usually retain most of their charge for several minutes after the supply is switched off and, therefore, the supply is dangerous to handle. With bleeders fitted the capacitors discharge within 15 to 60 seconds.

Miscellaneous hardware, chassis, wire AC plus, grommets, etc.

ACKNOWLEDGEMENT

The assistance of Dick Goslin, VK3N?? in the compilation of this series of articles on the Novice Transceiver, has been of great value. Dick has successfully built the transmitter and receiver as separate entities and not in the form of a transceiver as the author did. by the time that this appears in print, it is hoped that Dick, along with many other patiently (?) waiting would-be Novices who sat for the March examination have their callsigns and are making their presence felt on the bands. ■

COMMERCIAL KINKS

Ron Fisher, VK3OM
3 Fairview Ave.,
Glen Waverley, 3150

This month it's back to the FT101 with a couple of interesting faults that have been sorted out by Roy Hartkopf VK3AOH.

A nasty little fault concerns the shifting of the transmit frequency when the clarifier control is moved. The normal temptation is to tear the set apart looking for a leaky diode or capacitor in the clarifier control circuit. However before doing this, try shorting the ends of the clarifier together simply by joining pins 10 and 11 on the reg and calib unit MJ (6). You may find that as the clarifier is rotated the frequency will still shift. If this happens it will be because the varicap diode D1 in the VFO Osc is generating a voltage by rectification, because the RF applied to it is greater than the static voltage from the clarifier.

The cure is either to raise the static voltage or lower the RF applied to the varicap, or both.

The information in two different FT101 handbooks is wildly conflicting, and I suggest that since the clarifier is fed from a 6 volt line, the rectified voltage at the point where the clarifier line enters the VFO OSC unit (measured with a VTVM with the clarifier leads disconnected) should be about 3 to 4 volts maximum. If necessary select a capacitor, C4 in the VFO OSC unit to give this. Then make sure the clarifier static voltage is high enough to prevent rectification taking place. The most likely cause of this fault would seem either to be a manufacturing fault or an increase in the value of capacitor C4.

The next one is not really a fault but an odd effect caused by a popular modification to the FT101.

'One way of stopping the fan from running on receive with AC operation (heaters off) is to use the second pair of contacts (S5b) on the heater switch and permanently short the connection from the emitter of the side tone oscillator to the mode switch. This has the bonus that one can practice CW using the sidetone with the heaters off; *but* if one uses the transceiver on 12 volt DC operation and sets the mode switch to the CW position with the heater switch off there will be a continuous side tone. This is because the only thing that prevents the sidetone oscillator from working is the negative bias applied from the regulator past the key through pin 10 of the AF board to the base of the sidetone oscillator. On DC receive only, the transistor power supply of the 101 is not operating and so no negative bias is developed. It is of course up to the individual whether or not the original modification is worth while or not, but don't tear the set apart looking for a 'fault' when this occurs.'

COMMERCIAL INTEREST

Readers of this column may have noticed a small advertisement in 'AR' recently announcing the new G3LLL RF clipper designed for the FT200. Eric Colyer VK2BEL who is the local agent for the G3LLL clippers was kind enough to send me a copy of the installation instructions for the new unit. The actual work is a little more involved than connecting the unit to the FT 101 (see AR January 76) but not beyond the average amateur with a spare afternoon. Included in the installation notes is a concise method of setting up the AGC system of the 200.

It is hoped that a unit might be made available for review in the near future. ■

BOOK REVIEW

THE RADIO AMATEURS' HANDBOOK, 53rd EDITION — 1976 — PUBLISHED BY THE ARRL

Over 4½ million copies have been sold since first published in 1925. This latest edition has several new features, keeping up with the state of the art.

Some chapters have been rewritten and among these are those relating to wave propogation, SSB transmitter testing and station assembly. There are also many amendments to other areas and several new constructional projects.

Some of these are: the inclusion of a general purpose 9-12 volt variable power supply with a continuous load of 2 amps, and incorporating current limiting.

A solid state digital readout amateur band receiver covering 1.8 to 28 MHz in 500 kHz steps is given much attention.

New VHF and UHF receiving techniques have also been included. New features on an audio oscillator with selectable frequency range, filters for TV harmonics, a two tone audio generator for SSB testing and a 7 MHz mini beam, appear for the first time.

The ARRL Handbook continues to progress, and caters for beginners and experienced amateurs alike. — VK3UV. ■

Trade Review

The combination of THETAGRID and special transfers is a system for producing 1 off PCB's without the mess that etch resistant paints and inks can cause. Also, if, like me, your hand tends to wobble when drawing lines, then Thetagrid is the way out.

The THETA company have taken PCB laminate and covered it with a grid of 0.1 x 0.1 square inches. On to this one can stick etch resist transfers of full size foil patterns for ICs and transistors etc.

The required foil pattern is laid out directly on the board to be etched using the Thetagrid grid lines for alignment. The transfers are pressed firmly onto the board and smoothed to remove any slight wrinkles or bubbles that may occur by rubbing over the carrier sheet with a pencil. Although not supplied in the sample received, tapes for straight and bent conductor runs are apparently available.

It is possible to use some brands of the layup tape designed for making PCB photographic masters as a resist for direct etching, however the etch fluid tends to attack some of the adhesives and this can lead to etching away of the board tracks.

The grid pattern is removed from the board by the etching solution. It does not affect soldering.

The results of tests were quite satisfactory.

*Further data obtainable from THETA, P.O. Box 10, MARTOCK, SOMERSET TA 12 6 LT ENGLAND.

VK3AFW ■

MAGAZINE INDEX

Syd Clark, VK3ASC

QST April 1976
One KW — Solid State Style, Part 1; Learning the Work with Integrated Circuits; An ITV Cure for 6 Metres; Propagation — Past and Prospects; 360 deg. Steerable Vertical Phased Arrays; How to Use Zener Diodes; CW Super Selectivity; The Guatemalan Erthquakes — February 1976; How Much Does Gasoline Cost in Brazil.

RADIO COMMUNICATION June 1976
Audio Operated Squelch; Learning About Logic; Datong Frequency Agile Audio Filter.

SHORTWAVE MAGAZINE March 1976
marine VHF for Yachts; HF Band Converter.

April 1976
About Slow-Scan Television; Switching Applications of the Transistor; About HMS Mercury — The Royal Naval Amateur Radio Society; Mini-Rhombic Layout; Lecher Line System; S-Meter for the R1475. ■

VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, 5233

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR, Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	52.450
	VK2WI, Sydney	144.010
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4RTT, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RMT, Launceston	52.400
	VK7RTX, Devonport	144.900
	VK7RTW, Lonah*	432.475
VK8	VK8VF, Darwin	52.200
3D	3D3AA, Suva, Fiji	52.500
JA	JD1YAA, Japan	50.110
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	28.170
	ZL2VHP, Palmerston North	52.500
	ZL2VHF, Wellington	145.200
	ZL2VHP, Palmerston North	145.250
	ZL2VHG, Palmerston North	431.850
ZL3	ZL3VHF, Christchurch	145.300
ZL4	ZL4VHF, Dunedin	145.400

*Denotes new station.

On the beacon question, the boys in Tasmania will be pleased to know I have received a letter from John, VK4VK, in Sorrento, Queensland, indicating he heard VK7RNT, the new Launceston beacon on 52.400 on 9/6/76 at 0530Z at S5 for about 30 minutes. No VK7 operators were heard however. And so mid-winter DX pops up occasionally. I note also that John works 144 MHz SSB from time to time, so that's another we can add to the potential VK4 list of 2 metre SSB operators.

A letter comes from Winston VK7EM advising of the operation of a newly installed beacon with the call sign VK7RTW on 432.475 MHz from 31/5/76. Power output is approximately 20 watts into a bi-directional antenna orientated roughly NW to SE, with 800 Hz FSK ident. The beacon is operated by the North Western Branch of VK7 and Winston is responsible for its operation. So that is really good news and should be of interest to many.

George VK4GS has written an interesting letter with news of happenings in the Northern part of Queensland up to 16/6. He reports not many 6 metre openings to JA this year so far, and a few winter DX contacts to southern VK States. Ross VK4RO in Ayr, Joe VK4JH, Bob VK4RQ and Bill VK4ABG all in Townsville, Mario VK4MS in Ingham, and Graham P29DJ near Pt. Moresby are the present 6 metre stalwarts at present, with himself on occasionally. George also mentions that apart from himself, all the above plus several more in Townsville and Cairns have 144 MHz capability and keep an ear open for signals. Looks like my bit of talking when I visited Northern VK4 last year convinced some of you guys of the potential of 144 MHz, and it is pleasing to know so many are willing to try. Long distance contacts, and I mean really long distance will not come easily, but when conditions are right there will be the usual 400, 500 mile paths, with Es conditions giving 1000 miles and more. It is a matter of being patient and keeping the gear in good order by regularly using it for 100 to 200 mile contacts.

George also mentions VK4RO, VK4JH and VK4MS have 432 MHz SSB equipment and are all in the process of constructing helical antennae. It appears also that P29DJ is interested in the same band. Again this information will be noted with interest by those stations south of you, and we may yet see the day when contacts are possible between VK4 and other areas of VK. The fact that amateurs are prepared to have gear on bands which may only provide the occasional contact is something truly in the greatest of ham spirit, and I commend you all.

In addition to the above, George VK4GS sends a letter he received from Hatsuo JA1VOK in Japan, and the interesting parts to our readers is condensed herewith. Local QRM is very bad in Japan during the peak periods of Es openings. AG6JDX worked several times in April. VS6BE in Hong Kong worked 0500Z on 9/5 and on 11/5 worked 4 different times. The only beacon in Japan is the one we have listed, JD1YAA.

Japanese operators on 6 metres work CW between 50.050 and 50.100, SSB 50.100 to 50.250, AM 50.250 to 50.800, FM 50.850 to 52000. On 2 metres, they operate CW 144.070 to 144.100, SSB 144.100 to 144.300, and FM 144.320 to 146.000.

Hatsuo operates between 144.050 and 144.300 with CW or SSB using an 8 element yagi 19m high with a 500 watt transmitter. He proposes upgrading his antenna performance. Present polarisation is horizontal. He is very anxious to contact VK stations on 144 MHz and looks particularly to VK6 and VK8 operators, and now probably VK4 with the increased 2 metre capability in the northern area. Propagation tests are apparently being carried out around 102 MHz and indicate March and September to be the best months. If any aspiring 144 MHz stations with suitable antennae and power capabilities would like to try for such TEP contacts, why not write to JA1VOK, Hatsuo Yoshida, 1453-5 Kanasugi, Funabashi — City, Chiba 273, Japan, the results might be worthwhile.

From the pages of "Forward Bias" of the A.C.T. Division comes news that Bill VK1BH is now operational on 432 MHz using a 12 element beam. Also it was noted that the editor VK1ZME recently managed to transmit a TV test pattern at good strength across he length of his shack on 426 MHz. Good work Martin, but try opening the door next time and you could go a lot further

Another note mentions the return to the bands of Tony VK1VE who is now operational on 2 metres using a multi-mode transceiver and has been worked on the FM channels so far. For those of you who don't know, Tony was injured in an explosion which cost him his eyesight and the use of both his arms. His HF operation in the past was done mainly using VOX and a footswitch. Tony operates the controls of his equipment with his toes. And the paragraph concludes . . . "Welcome to VHF Tony, you will find a friendly group of amateurs here". And I might add it is great to hear how someone like Tony can overcome such serious disabilities, and it speaks much for that true amateur spirit, and I am sure we all commend his fortitude.

E.M.E. REPORT

As usual, from the pages of "The Propogator" some news to keep you informed on E.M.E. operation of VK2AMW at Dapto. It reads:

"Water leakage into a coaxial fitting of the transmitter RF output cable prevented operation during the U.S.A. window period of the monthly E.M.E. tests on 8/5. Signals were heard from JA1VDV while the cable was being dried out, but none from our scheduled stations in U.S.A.

"The European window test period later in the evening also resulted in no scheduled stations being heard although our echoes were up to 11 dB over noise.

"A special E.M.E. test was arranged by the Stanford Research Institute (WA6LET) Group for 23/5/76. Moonrise at VK2AMW during this test was 0218 EST on 24/6. Charlie VK2ZEN made all the necessary preparations over several days prior to the test and had the equipment operating some minutes prior to moonrise. Signals were not heard until the moon came up but it was subsequently found that the high power test scheduled for this time had not taken place.

"Signals were peaking to 20 dB over noise and averaged 15-16 dB. WA6LET was heard in contact with W3CCX, WB7BST, VK3ATN, JA9BOH and W9WCD during the test period. Some time was required to calibrate our system against the WA6LET signal level in preparation for the anticipated high power tests starting at 1800Z (0400EST) but they did not take place. However, WA6LET carried out the scheduled reduced power test shortly after this time and their signals were copied down to their lowest level even though they were using 3.6 kHz IF passband at the time. Another calibration run was then carried out on our receiving system.

"No attempt was made to transmit to WA6LET or any other station as they had indicated that this test was aimed at them working stations they had not worked before, plus obtaining information from their special high power tests. Charlie's time was fully taken up with calibration checks etc. Club member Ken Grimm helped out by operating the chart recorder, entering information on the chart record, etc. Bruce Proctor also assisted again during this test, which was in the wee small hours of the morning. Bruce has become an excellent second operator at Dapto and is quite an expert at dish pointing, information logging, assisting with signal checks etc. Keith VK2ZYI loaned a good quality stereo tape recorder for this special test to facilitate correlation of comments with signals on the tape".

I am sorry to note also that Lyle VK2ALU, the pioneer of Dapto E.M.E. operation, is still not able to get about for such tests due to a back injury, but I guess he still lends a hand with moral support and advice.

Also of interest is the fact that the operators at VK2AMW can hear their own echoes up to 10 dB above noise. Two way contacts have been made with stations in U.S.A., Canada, England, France, Italy and Japan and stations heard in Holland and Rhodesia. VK2AMW and G3LTF in England have successfully exchanged signals over the longest point to point distance currently obtained on the 70 cm amateur band, being 16955 km or 10535 miles. Good work chaps!

These notes have been prepared in a motel room at Lockhart N.S.W. whilst on a holiday run to visit Lyle VK2ALU and to have a look at the VK2AMW E.M.E. installation. Included on the agenda are a visit to Ray VK3ATN and Ron VK3AKC, who also have E.M.E. equipment. So in an effort not to disappoint all my good readers, the necessary information had to be brought with me in the car and prepared in this room. So if anyone wrote to me towards the end of June it is likely your news would not be included as I left before the end of June. If it is still current news, it will be included next month.

So at this point there isn't much left to report, except to say I noticed a little par in the VK7 QRM which reads: "Definition: Of a half wave. A greeting to someone you don't really like". So on the strength of that I will conclude with the thought for the month which I also brought with me: "People with an axe to grind often fly off the handle".

The Voice in the Hills. ■

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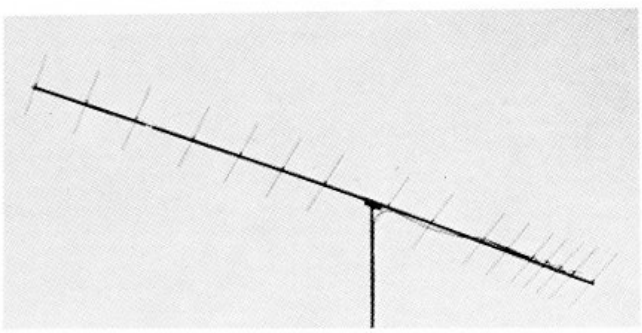
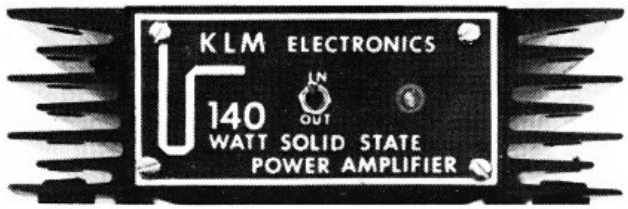
  (2) All parts except booms.
  - 144-148 MHz — 8 Models including 2 for circ. polarization.
  - 420-470 MHz — 5 Models including 16 el. 12 ft. boom 15 dB gain.
  - 52-54 MHz available shortly.
- **QUARTER WAVE SLEEVE BALUNS**
  2-way and 4-way power dividers and couplers:
  144-148 MHz
  420-470 MHz
  - Tubing, Lowloss coax., connectors, etc.





- **SOLID STATE AMPLIFIERS (13.5V DC Nominal)**
  To suit your FM/CW/SSB rig (no tuning micro-stripline circuitry).
  - 144-148 MHz — 14 Models including 7 linears.
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  - 52-54 MHz available shortly.

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TELEGRAPHY SYSTEMS

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As above with rechargeable batteries and charger. $65

MSK-2 Keyer circuit as in

SK-2, but without built-in paddle and with addition of two independent 1024 bit memories (approx. 85 characters each) which can be programmed and re-programmed through the keyer at any time and replayed when required. Built-in rechargeable battery gives non-volatile power-down memory holding capability of at least 120 hours, and permits portable operation. Easy to operate.

Complete with charger $85

Twin-lever paddle for above keyer (as used in SK-2, but with base, cover and lead.) $15

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We also manufacture a range of automatic transmitters, standard range from 256 to 4096 bits in case 185 x 120 x 60mm, for Morse or Teleprinter operation. Outputs key up to ± 300v or Telegraph line as required. Designed for Station Identification, Beacons, Emergency Transmissions, Line Testing etc. Variable speed and repetition rate provided.

Details sent on request.

All prices include Air Mail paid. All equipment ex-stock at present.
Trade enquiries welcome.
100 SANDFIELD ROAD, ARNOLD, NOTTINGHAM, ENGLAND.

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP

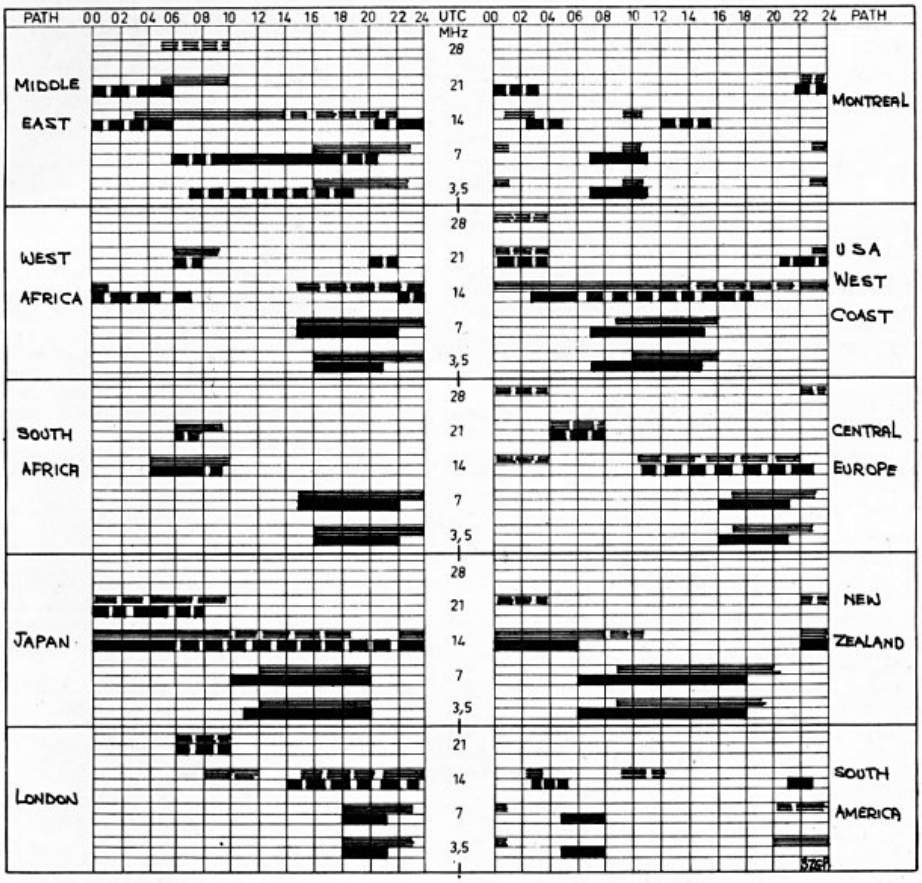

CHART LEGEND
LINES FROM WESTERN AUSTRALIA.
BARS FROM EASTERN AUSTRALIA.
ALL TIMES: UNIVERSAL (GMT).
SOLID LINES/BARS: BETTER THAN 50% OF THE MONTH BUT NOT EVERY DAY.
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PREDICTIONS: COURTESY I.P.S. SYDNEY.
SUNSPOT DATA: DR. WALDEMEIR, SWISS FEDERAL OBSERVATORY, ZURICH.
OTHER DATA: WWV/H DAILY AT HOUR PLUS 14, 18, 45 MINUTES.

20 YEARS AGO

Ron Fisher, VK3OM

Looking through the August 1956 issue of Amateur Radio, I noticed William Willis advertising the Gorler Coil Turrets. I wonder if a few are still tucked under the bench waiting to go into that receiver to end all receivers. They were quite a massive device, and as far as I can remember one of the very few turrets for all band coverage ever released as a separate unit. Those all band Russian transistor radios available today on the local market are about the nearest approach to the Gorler turrets that I have seen.

The Broadcasting Control Board recommendations for TV receiver IF frequencies were published in full along with the reasons for their choice. The three ranges considered were 20 to 30, 30 to 40 and 40 to 50 MHz, with the final recommendation being of course 30 to 40 MHz.

Technical articles for August included Don Haberecht's massive 20-15-10-5 and 2 metre beam. The 20 to 5 metre section was a W8JK with a 24 element phased array on top for 2 metres. If you happen to be one of the younger fellows, the W8JK is two element beam with both elements fed in phase. As in this case, they could be fed with tuned feeders to achieve multi band operation. The W8JK was originally developed about 1937 by John Krause. C. W. Mann VK5DF described his phone and CW monitor, and J. G. Oliver VK7JO showed how to set up an index system while Jim Lloyd VK3AST provided a few hints and kinks.

Australia and the International Geophysical Year. Professor H. C. Webster explained the aims behind the event and how amateurs could help with observations of propogation especially in the 50 to 60 MHz region. ■

QSP

STATISTICS AGAIN

FCC in the USA received 11458 amateur applications during February of this year and at the end of that month 263,896 amateur operator's licences were extant. Novice licences were 24,154, Technical 51,664, Conditional 25,633, General 80,313, Advanced 67,636 and Extra 14,496. June '76 QST.

IARU NEWS

Encouraging signs are appearing of the formation of an amateur society in Papua New Guinea. Such a society certainly would be invaluable to the IARU quite apart from any other services it might be enabled to perform on behalf of the members.

PNG is a member of the ITU and therefore possesses one vote at ITU Conferences — especially WARC 79. Readers will be aware of the tremendous efforts being made to establish a favourable attitude to amateur radio in administrations of ITU member countries where amateurs are few or non-existent. This has particular reference to the "Third World" countries where each possesses that one vital vote.

In Region 3 there are 27 countries that are members of the ITU each with one vote; as always, 9 of these countries have amateur radio societies affiliated with the IARU R3 Association. Amateur radio is a banned activity in up to 5 or 6 of the other countries.

Hugh Cassidy, WA6AUD writing in his DX column in CQ April '76 about possible China (BY) activity records that some of the VS6 amateurs feel that the possibilities of some (amateur radio) activity has improved in recent years but that activity probably would come from Chinese nationals within the country (rather than visitors from outside) and operating a station at a technical school or a radio club station.

Reverting again to this important ITU one country one vote rule, it is interesting to observe the representation of the small Region 3 ITU member countries compared with the larger countries.

The five largest area or population countries (China, Japan, India, Indonesia and Australia) cover nearly 23 million square kms with a total population exceeding 1,500,000,000.

Fiji covers 18,000 sq. km, population 535,000. Nauru covers 2 sq. km, pop. 6700. Tongas 700 sq. km, pop. 77,000.

One would be forgiven for believing that perhaps one day other criteria could apply. ■

HAMADS

- **Eight lines free to all WIA members. $9 per 3 cm for non-members.**
- **Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.**
- **Commercial advertising is excluded.**
- **Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.**
- **QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.**

FOR SALE

Collins 62S1 Converter 6 and 2 m spare final tube with external power supply to suit, $270. American speech processor for Drake TR3 or TR4, as new, $15. G. C. Ramsay VK5GD, 15 Eliza St., Adelaide, S.A., 5000. Ph. (08) 51 9497.

3 Mono Band Yagi Beams 10, 15, 20, $100. Purchaser to dismantle off windmill tower. VK3BW, Portarlington. Ph. (052) 59 2322.

Ken KP202 Transceiver with nicads and charger, Chs. 1, 2, 3, 4, 40, 50, $150. David Farquharson VK1ZDF, P.O. Box E338, Canberra, ACT. Ph. (062) 63 3166 Bus.

FR100B Receiver, FLDX400 Transmitter, interconnecting wiring harness, YD844 microphone, best offer will take, Eddystone EC10 general coverage Rx all transistor, $140. FT75B Transceiver, FP75B power supply, FV50C VFO, 2 spare 12BYG7 tubes for final, $320. VK4LK, V. Kerr, Box 237 Charleville, Qld., 4470.

Barlow-Wadley XCR-30, mark 2, as new, all accessories, $170, also AR7 including 10 metre coil box and circuits, $25. W. R. Gronow, VK3WG, Ph. (03) 56 7231 daytime.

Frequency Meter 200 MHz, $150. Petrol driven generator, 12 volt, 30 amp with battery start, ideal for field days, $90. VK3AFQ, QTHR. Ph. (03) 96 2414.

HAMADS—(cont.)—For Sale

52-144 MHz Transverter, see page 5 of March '76 AR, $50, includes PCB, crystal, diecast box fuses, panel meter, BNC con. and IGL receive conv. unit working OK. N. Cooper VK4ZNC, 5 Cahill St., Strathpine, Qld., 4500. Ph. (07) 205 2121.

Teletype Model 15 with keyboard, $70. Marconi Mk. 4 IO. Television camera with lenses etc., complete and working $200 o.n.o. VK2ZPM, QTHR. Ph. (02) 476 2304.

6 m Belcom Liner SSB-AM, $210; 2 m Belcom liner SSB, CW, 144-146 MHz, $240; both as new, all access. 4 6KD6 valves, new $5 each; 2 6883B (12V 6146B) valves, new $4 each; National NCX3 80-40-20 transceiver complete, V.G. order $130; 2 BLY90 new $15 each; 2 BLY88A new $10 each; 6/40 sockets new $2 each; TH6DXX antenna with balun, V.G. order $110; STC 2 m 50W FM transistorised PA, brand new $50. Buyers pay freight. VK7NR, QTHR. Ph. (003) 27 2928.

No. 62 Set Transceiver, 1.6-10 MHz; TR1936 Transceiver, 110-150 MHz; both with circuit diagrams, ideal wrecking or restoration, any offers? P. Hamilton, 10 Highmoor Ave., Bayswater, Vic., 3153. Ph. (03) 729 2504.

Multi 7 2 Mx FM Transceiver with repeaters and anti repeaters 2, 4, 6, 8 (new plan), Simplex 40, 43 (R3 input), 50, 51, 65, mobile mount mic. cable, exc. cond., $185. Microphone compressor — Katsumi MC22S, compression level meter, Hi/Lo imp. input, 2 tone oscillator, runs on 9V transistor radio battery, fair cond., work well, $20. Linear Amplifier, 2 x 813, covers 80, 40, 20, 15 Mx with provision for extra band, hefty PSU (v/heavy), RF unit compact table top type, 2 spare tubes, works very well, needs tidying up, buyer to collect, $175 o.n.o. B. Bathols VK3UV, QTHR. Ph. (03) 90 6424 (evenings only).

Ken KP202 hand held chs. 40, 50, repeaters 1, 2, 3, 4 (now called 2, 4, 6, 8) nicad batteries, A and R charger fitted with meter and LED, helical and whip antennas, orig. handbook and pkg., 8 watt O/P diode switched power amp for mobile use, $160 the lot. Oscilloscope Heathkit 012U 5 inch, 5 MHz AC input only, with handbook and probe, $60. Ted VK3XT, QTHR. Ph. (03) 560 5051.

RCA AR88D Communications Receiver 0.5-32 MHz continuous. 2 x RF stages, 5 x IF. Xtal filter, variable selectivity. Recently overhauled and aligned to original spec. Plus set of spare tubes, instruction manual and speaker. Still one of the world's best Rx. High stability, suitable RTTY, $160 o.n.o. VK3ZA, QTHR. Ph. (03) 67 6415 bus., (03) 787 1325 home.

Carphone MR3B, 2 m, Ch. 40 (B), solid state PSU, new final, handbook, $30. VK2YCS, QTHR. Ph. (02) 44 3141.

TCA 1677 Transceiver, complete with mic. and xtls, good clean condition on 6 m FM 52.525 MHz, $50. 4 switching boxes to suit 1677, $10 the pair; car cradle for above $3. VK3ACM, QTHR. Ph. (057) 68 2260 A.H.

Hy-Gain 2 m 5/8 Mobile Whip, magnetic base, excellent performer, $27 (cost $41). VK3LJ, QTHR.

Icom IC22A, 3 months old, rep. 2, 4, 7, 8 and simp. 40, 50, 51 and 53, $170; Yaesu FLDX400 Tx, good cond., etc., $200. Reg VK3KK, QTHR. Ph. (03) 46 4200 A.H., (03) 652 8489 (bus.).

Yaesu FT101E Transceiver as new, only 6 mths. old, $590. Also FTDX100 Transceiver, perfect, just expertly overhauled $350. VK2APP, QTHR. Ph. (063) 83 6206.

432 MHz Base Unit, $100; FTV650, $120; RTTY tape punches, $10 ea. TV typewriter boards, $20 for set. VK3BOB, QTHR. Ph. (03) 58 7441.

Yaesu FTDX560 incl. 160 m, $375; Hallicrafters S27 Rx 27-144 MHz, $50; Geloso G207 Rx 80-11 and 10 m, $40; RCA BC348-0 Rx 455 kHz IF, prod. det., $50; TCA 1677 2 m Chs. R1, R4, R6, 40, 25W, $95; AWA MR3A 2 m Chs. R6, 40, A, 10W, $35; H/B Transverter 6 m 6/40 PA, $45. VK2ADY, QTHR. Ph. (067) 65 8664.

Transverter — 6 metres, suits all Yaesu Musen transceivers, 60W PEP out, $40. VK3ATQ, QTHR. Ph. (03) 707 2110.

Yaesu FT101B Transceiver with dummy load, SWR meter, very little used, exc. cond., $500; Webster Bandspanner with base, $25 or offers; CRO 5" home brew, wkg. order, $35. Deceased's effects. Offers to Mrs. Winton, 33 Somerset St., Wantirna Sth., 3152. Ph. (03) 231 2664.

WANTED

9 MHz Filter and carrier xtals to suit Plessey transceiver, published in E-Aust. Aug. '74 (FT200 filter xtals would do). Also the Plessey SL600 series ICs for the circuit. VK3ZR. Ph. (03) 89 4645 A.H.

Galaxy V Transceiver and external VFO, calibrator etc. VK3FI, QTHR. Ph. (058) 21 2705.

Amateur Radio, April 1973 copy — to buy. R. Lenthall, Ridley College, Parkville, 3052. Ph. (03) 380 9601.

Linear Amplifier — FL2100B or Heathkit 220 or similar, compact table top type. Price and details to B. Bathols VK3UV, QTHR. Ph. (03) 90 6424 (evenings only).

Signal Generator 2-500 MHz if possible (lower frequency range considered). T. R. Naughton, Box 80, Birchip, 3483.

Wireless World as listed 1967, 1968 Jan., Feb., 1969 April, 1970 Nov., 1971 April, 1972 August, reasonable price paid single or lot. VK5PI, QTHR. Ph. (08) 264 2061 A.H.; (08) 337 7000 bus.

Yaesu FT200 Transceiver with AC power supply, mike, handbooks, etc., must be in perfect condition, particulars to VK2AJM, 9 Summit Rd., Terrigal, NSW, 2260. Ph. (043) 84 3186.

Swan Sun Band Pass 144 MHz Yagi antenna hardware, mounting insulators (blue) etc. Your antenna building failure is worth top cash for FB parts. Quantity and price to VK2ZNW, Box 1117, Orange, 2800.

SILENT KEYS

It is with deep regret that we record the passing of —

Mr. L. A. T. POWERS	**VK2EP (formerly VK3APS)**
Mr. R. A. HOLT	**VK2HW**
Mr. H. I. SHIRLEY	**VK3AQJ (formerly VK3ZOO)**
Mr. W. G. BIGGS	**VK3ZBZ**
Mr. F. H. BULL	**VK2AJM**
Mr. C. J. WILKINS	**VK2ALB**
Mr. E. G. CLARE	**VK2ALL**
Mr. NORM TYAS	**VK4TY**
Mr. BILL FABER	**VK4WF**
Mr. MAXWELL JOHN SWABY	**VK4DA**

Max obtained his Amateur Licence in Victoria at the age of 16 years and was active on the Ham Bands right up to his untimely death on 28th June this year, at his home near Dalby, at the age of 57.

During World War Two Max rose to the rank of Squadron Leader, RAAF, and soon after his discharge moved to Dalby where he ultimately became the largest Radio and Electrical business in the town; but eventually sold out to take over a large grain-growing property on the Condamine River.

However, manual labour was ruled out when Max developed a heart condition, and not being the idle type, founded a two-way radio business which flourished and gave him much pleasure. Max will be sadly missed by his numerous friends who offer their deepest sympathy to his wife, son, daughter-in-law and grandchildren. — VK4RF.

OBITUARY — JOHN BATTRICK VK3OR

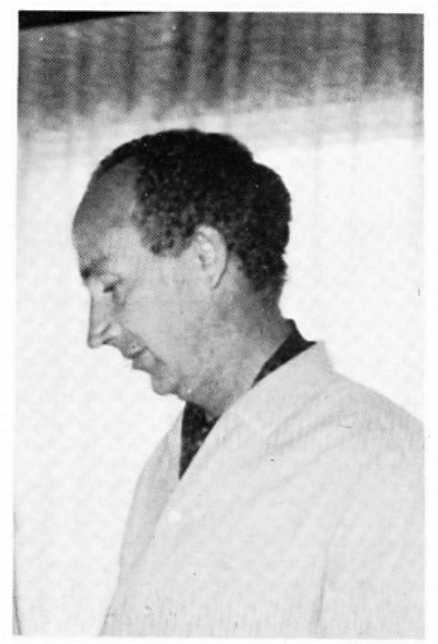
It is hard to know where to start to write about John Battrick — he did so many things. He was first licensed as VK3AKJ later as VK3OR. He became interested in amateur radio in the early 1950s when as a teacher posted to Yarram he met another amateur who was also a teacher — Peter Williams VK3IZ. Six months later he had his licence. By the end of the 1950s both Peter and John were again living in Melbourne and both became interested in Institute affairs. In the following years John became a member of the Council of the Victorian Division and was its President from 1963 to 1965, from 1967 to 1968 he was Federal Secretary and from 1968 to 1969 he was Federal President. He became the WIA Director of the IARU Region 3 Association from its formation in 1968 with Peter Williams as its Secretary. He held that position until the framework of the organisation was formalised at the Tokyo Conference in 1971.

In most of these activities he was working with his friend Peter Williams and always encouraged by his wife Gwyn.

These were only some of the Institute activities with which he was concerned. At different times he was Victorian Division Disposals Secretary, Federal Oscar Co-ordinator and Victorian Division Wicen Co-ordinator — the latter was an activity in which he was always interested and always tried to find time to become involved.

John's tremendous enthusiasm and determination to get the job done characterised everything he did. Despite the impressive list of positions that he held, I think that his most important contribution in the long term was the vision that he shared with Peter Williams of the need for a regional amateur organisation. Both he and Peter were at the time members of the Federal Executive and together they were the catalyst that ultimately led to the inaugural meeting in Sydney that in turn led to the formation and development of the Region 3 organisation as it is today. This is not of course to underestimate his influence and contribution to the Institute in other areas. He was particularly involved in the many years of discussion that ultimately led to the adoption of the present Federal Constitution that has led so rapidly to the new importance of the Federal body. At the Federal Convention in Melbourne in May this year the Federal Council resolved to recognise his contribution to amateur radio by recommending his election as a Life Member.

John passed away on 21st May 1976, aged 47 years. VK3KI



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